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Explosive Arm Power and Its Relationship with the Accuracy of Power and Float Serves in Volleyball Players

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Abstract

The research aimed to identify the performance level of the serve, both the smash and the wave, among the research sample, and to determine the effect of the speed-strength level of the arms on the performance of the smash and wave serves among the sample. The research sample. The researchers used the descriptive approach with a survey methodology, considering it the best and easiest method for achieving the objectives of this research. The objectives set by the researchers for their research and the procedures that They use it based on the nature they will choose, and accordingly, the researchers chose their research community from the players of the College of Physical Education and Sports Sciences at Al Ain University for the academic year (2024-2025), and selected a sample from them. The number of players was (7) out of (14) players, representing (50%) of the original population. The researchers used the serve accuracy test to measure the serving skill of the volleyball players in three The researchers used the Statistical Package for the Social Sciences (SPSS) and the following formulas: arithmetic mean (x), standard deviation (y), and Pearson correlation. The results showed varying levels of different values among the research sample. The researchers examined the performance of the smashing and undulating serve. They concluded that the players' abilities varied in performing the speed-strength arm test, and that a significant correlation existed between the speed-strength test and the players' performance. With speed and accuracy in

the smashing serve, a significant correlation emerged between the speed-strength test and the accuracy of the wave serve. The speed-strength component of the arms plays a major role in achieving high levels. From the skillful performance in many sports activities in general, and in volleyball in particular, and specifically in the skills that the researchers addressed (serve accuracy) in particular.

Keywords: Explosive Arm Power, Power Serve Accuracy, Float Serve, Volleyball Players

1- Introduction to the Research:

1-1 Importance of the Research:

The developed world is witnessing significant progress in athletic achievement as a result of the continuous efforts of scientists. The practice of sports is no longer solely for recreation and done randomly, but has become... The practice is based on scientific foundations provided by many sciences, thus the science of sports training has become a broad field and has been able to benefit from the experience of other sciences such as (physics, physiology, anatomy, chemistry, etc.) Aqeel Abdullah: 2002

In order to elevate the level of athletic achievement, the teaching process has come a long way, benefiting from the rapid scientific advancements the world is experiencing today. Volleyball is one of the sports that excels in this regard. Its numerous basic offensive and defensive skills are largely characterized by their interconnectedness and sequencing.

This interconnectedness is crucial in ensuring that most skills receive equal training and practice. One of the important offensive skills that can influence the opponent's reception, disrupt their offensive technique, or even score a direct point, is the serve. The smash, which is the most commonly used serve in most matches due to its effective impact on the opposing team's reception, has also seen the emergence of a new type of serve that has recently become prominent or is similar to it. With the powerful serve, also known as the undulating serve. Upon observing the training of the Faculty of Physical Education team, the researcher noticed some weakness in the execution of this serve, thus the researchers focused on this aspect. Important physical attributes, trying to find the relationship between speed-strength and serving because it may be one of the reasons for weakness in performing these skills.

1-2 Research Problem:

Volleyball has become the focus of attention for millions of fans due to the development in the technical aspects of the game. Its offensive skills, especially the serve, have undergone significant and rapid developments. The speed of the powerful serve internationally has reached 150 km/h, making it much more difficult to defend against. This was observed in the volleyball team of the College of Physical Education and Sports Sciences at Al Ain University. We observed that very few players possess the ability to perform the serve (bouncing and swivel) at the required level, or to win a point directly with a serve, or at least to hinder the opposing team. This The deficiency resulting from the lack of exercises in training sessions, particularly those related to serving skills, as well as the significant decrease in physical fitness levels, especially the element of speed-strength muscles. The arms play a key role in the success of powerful and sweeping serves. Furthermore, the accuracy of the player's shots into the opponent's court is crucial and must be carefully considered, as it significantly impacts the team's chances of winning.

1-3 Research Objectives:

1- To identify the performance level of the serve, both the smash and the wave, among the research sample.

2- To identify the effect of the speed-strength level of the arms on the performance of the smash and the wave serve among the research sample.

1-4 Research hypotheses:

- 1- There are differences in performance between the accuracy of the smash and wave serve skills in different areas of volleyball for the research sample.

2- There is a statistically significant relationship between the values of the smashing serve accuracy test results and the values of the speed-strength arm test results in the research sample.

3- There is a statistically significant relationship between the values of the wave transmission accuracy test results and the values of the speed-strength test for the arms in the research sample.

1-5- Research Areas:

1-5-1- Human Field: Players of the College of Physical Education and Sports Sciences - Al Ain University - Volleyball Team for the academic year (2024-2025).

1-5-2- Location: Volleyball court at the College of Physical Education and Sports Sciences, Al Ain University.

1-5-3 Timeframe: From November 1, 2024 to March 1, 2025.

2- Research Methodology and Field Procedures:

2-1 Research Methodology:

The researchers used the descriptive method with a survey approach, considering it the best and easiest method for achieving the objectives of this research. [Since survey studies currently focus on and examine the situation...]

In greater depth, by providing the researcher with detailed and analytical information (Wajih Mahjoub: 1993).

3-2 Research Population and Sample:

The objectives that researchers set for their research and the procedures they use are based on the nature of the research.

They will choose it (Rissan Khuraibat: 1987). Accordingly, the researchers chose their research community from the volleyball players of the College of Physical Education and Sports Sciences at Al Ain University for the academic year (2024-2025). They selected a sample of (7) players from among (14) players, representing a percentage of (50%) of the original community.

2-2 Research Tools:

1- Volleyballs (10)

2- Stopwatch

3- Whistle

4- Adhesive tape

5- Electronic calculator

2-3 Tests Used: (Risan Khuraibat: 1997)

2-3-1 Test of Transmission Accuracy:

- Purpose of the test: To measure the serving skills of volleyball players in three zones.

- Equipment: A volleyball court divided into (3) zones as shown in Figure (1), ten volleyballs, and tape.

Performance specifications: The tester performs (5) legal serves in each center, sent from the end of the court line facing the half of the court from areas (A, B, C). Each score within the division is considered the score awarded in the event of the ball falling inside the area.

The player's score is recorded according to where the ball falls, as shown in the given score field (75), and the performance is evaluated out of (15) points.

2-3-2 Speed-Strength Test of the Arm Muscles (Mohamed Sobhi Hassanein: 1997)

- Flexion of the arms (front support) from a prone position in seconds.

- Purpose of the test: To measure the speed-strength of the arm muscles.

Equipment and supplies: - Stopwatch. - Colleague to count the number of flexion and extension repetitions.

- Test procedure: - From a prone position, ensuring the body maintains proper alignment by touching the chest while fully flexing and then fully extending the arms. - Assessment: The number of flexion and extension repetitions in ten seconds is an indicator for measuring the speed-strength characteristic of the arm muscles.

2-5 Exploratory Experiment:

The researchers conducted a survey on a sample of (4) players from the Faculty of Physical Education and Sports Sciences on (1/11/2024). The aim of the experiment was as follows:

1. To determine the extent to which the participants understand the test items.

2. To assess the suitability of the instruments used.

3. To overcome any errors or obstacles that may arise during the experiment.

4. To ensure adherence to the timeframe and commitment required for conducting the test.

5. To evaluate the efficiency of the support team in completing their task.

2-6- Main Experiment:

The main experiment was conducted on (7/12/2024), at the volleyball court in the College of Physical Education and Sports Sciences - Al Ain University, with the assistance of the support staff, at 10:00 AM. The number of attempts reached (210), distributed as (15) attempts for the smash serve and (15) attempts for the wave serve for each player, with each player performing (5) attempts in each area [A, B, C] as In Figure No. (1) for both types of transmission, the best and most accurate attempt was selected, which obtained the best values from (5) attempts, and for each area there is a type, taking into consideration that the evaluation is out of (15) degrees.

The second test was conducted at the same time and with the same components as the first test.

2-7 Statistical Methods: (Wadi' Muhammad Yasin: 1999)

The researchers used the Statistical Package for the Social Sciences (SPSS) and the following formulas: the arithmetic mean (x), the standard deviation (r), and Pearson's simple correlation.

3- Presentation, Analysis, and Discussion of Results:

3-1 Presentation and Analysis of Results for the Speed-Power Arms Test and its Relationship to the Spike Serve in Volleyball:

Table No. (1)

Shows the arithmetic means for the Speed-Power Test and the Spike Serve Accuracy Test, the calculated (r) values, and the test significance.

on	Variables		Calculated r-value	Critical r-value	Significance of the Test
	Speed–Strength Test / D	Spike Serve Accuracy Test	0.822	0.754	Significant

	X	**sd**	**x**	**sd**			
	14	**0.91**	**48**	**0.88**			

By observing Table (1), it is clear that the arithmetic mean value for the test (transmission accuracy) reached (48), and the standard deviation value reached (0.88). As for the second test (reliance From the front) through Table No. (1), it was found that the value of the arithmetic mean reached (14), the value of the standard deviation reached (0.91), and the value of the calculated simple correlation coefficient reached (0.822). Comparing it to the tabulated value, we find that the calculated value is smaller, as the tabulated value of (r) is (0.754). This indicates a significant correlation between the speed-strength of the arms and the skill of the smash serve. The research sample was at the beginning of the general preparation phase, which includes intensive strength and speed exercises that in turn require high levels of effort.

Most of those training sessions avoid using basic skills, i.e., not using the ball in them. Consequently, the player lacks a feel for the ball, and this is reflected in the technical performance of the smashing serve skill, which requires a high feel for the ball.

The researcher believes that the reason for this is the failure to provide exercises specific to training units during the training period and the neglect of the majority of the physical attributes related to performing this skill well, where

The skill of a high-quality serve primarily requires the arms during its execution, and this enhances the characteristic speed and power of the arms, which are physical attributes closely linked to the performance of volleyball. Especially the serving skill, which requires a high level of physical effort.

This necessitates focusing on providing a set of specific drills to develop this skill during teaching and training sessions.

3-2- Presentation and Analysis of Results for Speed-Power and its Relationship to the Wave Serve in Volleyball:

Table No. (2)

Shows the arithmetic means for the Speed-Power test and the Wave Serve Accuracy test, the calculated (r) values, and the test significance.

on	Variables				Calculated r-value	Critical r-value	Significance of the Test
	Speed–Strength Test / D		Spike Serve Accuracy Test		0.85	0.754	Significant
	x	sd	x	sd			
	14	0.91	39	0.88			

By observing Table No. (2), it becomes clear that the arithmetic mean value for the test (transmission accuracy) reached (39), and the standard deviation value reached (0.88). As for the second test (front-end support) Table (2) shows that the arithmetic mean was (14), the standard deviation was (0.91), and the calculated simple correlation coefficient was (0.85). When compared to the value The tabulated value shows that the calculated value is smaller, with the tabulated value of (r) being (0.754). This indicates a significant correlation between the speed-strength of the arms and the skill of the wave serve. The research was in the initial general preparation phase, which includes intensive strength and speed exercises that require high levels of effort. Most of these training sessions avoid using basic skills, i.e., not using the ball in them. Consequently, the player lacks a feel for the ball, and this is reflected in the technical performance of the wavy serve skill, which requires a high feel for the

ball. The researcher believes that this is due to the failure to provide exercises specific to training units during the training period and the neglect of the majority of the physical attributes related to performing this skill effectively. Good, as the skill of a quality serve primarily requires the arms during its execution, and this enhances the characteristic speed-strength of the arms, which are physical attributes closely linked to the performance of volleyball. The serving skill, in particular, requires a high level of physical effort. This necessitates focusing on providing a set of specific drills to develop this skill during teaching and training sessions.

3-3 Discussion of Results:

In this context, Qasim Hassan Al-Mandalawi and Ahmed Saeed (1979) emphasize that the formulation of excellent exercises can contribute to the development and improvement of motor skills, in addition to developing essential basic physical qualities. This is what Muhammad Adel Rushdi confirms in 1976 that the purpose of the exercises is to focus on strengthening specific muscle groups to suit the type of activity being practiced... and these exercises are linked to the skill or technical performance (technique) (Muhammad Adel: 1976). Researchers believe that these two skills are "important offensive skills in the game, requiring the player to possess explosive arm power to perform them in order to achieve a direct point" (Aqeel) Author: 2002) Researchers attribute the emergence of this relationship between the explosive power of the arms and the accuracy of performing the two skills under investigation to the great importance of muscular strength and its two forms: the explosive power of the arms, on which the height of the player’s jumping depends, because the performance of the skills under investigation is based on it.

4-1- Conclusions:

1- The emergence of varying levels of performance in the crushing and wave transmission accuracy among the members of the research sample.
2. The players' abilities varied in performing the speed-strength arm test.
3. A significant correlation was found between the speed-strength test and the accuracy of the smash serve.
4. A significant correlation was found between the speed-strength test and the accuracy of the wave serve.

5- The element of strength characterized by speed of the arms plays a major role in achieving high levels of skill performance in many sports activities in general, and in volleyball in particular, and specifically in the skills that the researcher dealt with (serve accuracy) in particular.

4-2-Recommendations:

1- Emphasize the proper technique of the jump serve, focusing on the specific phases involved in each stage.

2- Work on training players to differentiate between these two serves and emphasize the angle of flight. The player in both serves is different due to the difference in the point at which the ball is hit.

3- Emphasizing the need to conduct periodic tests on the skill of accurate serving and the element of power characterized by speed in order to stand immediately on the level of the players.

4-. Develop training programs to improve serving skills, given their importance in matches.

5-Develop a training program to enhance speed-strength skills for the research sample.

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