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RELATIONSHIP OF THE SYNCHRONIZATION OF THE STRIKING ARM WITH THE RISING FOOT AND SOME KINEMATIC VARIABLES WITH THE ACCURACY OF THE JUMP SERVE IN VOLLEYBALL

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Abstract
The importance of the serve level and its kinematic variables and the importance of the movement of the rising foot being synchronized with the movement of the striking arm were addressed. The correlation between the movement of the striking arm with the rising foot of and some kinematic variables of the stage of the jump serve. The research hypothesis was the existence of a positive correlation between the movement of the striking arm with the rising foot and some kinematic variables of the level of the serve, where the researchers used the descriptive approach to solve this problem and the research sample was the volleyball team of Misan Governorate for youth, as for the research tools, they were test and measurement, as the sample was tested, and after the completion of the main experiment, data were collected with special forms to be processed statistically through the use of appropriate statistical laws, and the results were presented, analyzed and discussed scientifically in the fourth chapter. The results were all moral. Depending on these results, conclusions were reached, including: (The movement synchronization between the striking arm and the rising foot has a positive effect on the accuracy of the serve), according to this, the researcher recommended the need to pay attention to these kinematic variables and the state of movement synchronization of the volleyball player.

Keywords: Striking Arm, Rising Foot, Accuracy, Jump, Volleyball.

Introduction

Sports training aims to improve the various foundations and factors that have an active role in developing the athletic level of various sports, and one of these foundations is the physical preparation, which is the basic foundation for improving the various physical and physiological characteristics of the players, whether in team games or individual games, whose development inevitably affects the skill level (Santos et al., 2020).

The game of volleyball is one of the games that is directly affected by the physical numbers as a basis for developing the skill side after applying the various conditions associated with the skillful performance, whether these conditions are technical or mechanical and according to the rules of the game (Getahun, 2022). The performance of volleyball skills is affected by the accompanying biomechanical conditions, which reflect the ideal and true reality of applying these skills according to the movement situation of these skills (Le Noury et al, 2022). It can be said that the application of these skills is affected by specific factors that are directly related to each other, and the first of these factors is the final mechanical ability (Abdullaev, 2022). It means (the use of force and speed at the same time) as well as the rest of the biomechanical variables (Blanco Ortega et al., 2022). When discussing this topic from a scientific point of view, attention is focused on what force causes of acceleration to the body or to a part of the body during the kinetic application of the skill of jump serve in volleyball (Boyce & Schoenfeld, 2022). This direction is complicated when more than one variable interferes in the performance of this skill (Josefsson et al., 2019). When the body rises to the top, and the striking arm moves in the jump serve from the back to the front in order to give the ball an appropriate speed that achieves the team a direct point (Mekuriyaw, 2022), and determining the amount of ability plays an effective role in that, and by studying the percentage of the ability's contribution to these parts, as well as some other biomechanical variables (Rigozzi, Vio & Poronnik, 2022), it is possible to help coaches determining the most important variables that contribute to achieving skill as a result of launching the ball and relying on that to determine the appropriate training doses that depend on the maximum amounts of the body parts contributing to the performance.

Research Problem:

Volleyball players in Iraq suffer from a weakness in the serve when compared to the level of global performance (Abduljaleel & Hamoodi, 2021), despite their continuity in the training process and the application of most exercises, which in turn raise the physical level such as strength, speed of the serve and flexibility (Fail, 2021), and perhaps the level of physical capabilities of Iraqi players and their physical patterns are not lower than the level of international players (Sabr, Fail & Ashoor, 2021). The difference between the two levels lies in the performance of the most accurate

technique for the stages of the jump serve (Mohammed & Rashid, 2020), especially the jump serve, as well as focusing on the things that have the most positive impact to increase the distance of the serve (Mohammed, 2021). The training process and therefore the researchers decided to solve this problem by identifying the correlation of the motor synchronization of the striking arm and the advancement foot in the transmission phase and between the special kinematic variables.

Research Objectives:

1- To identify the correlation between the movement synchronization of the striking arm and the rising foot and some kinematic variables of the performance of the jump serve in the research sample.

Research hypotheses:

1- There is a positive correlation between the movement synchronization of the striking arm and the rising foot and some kinematic variables of the performance of the jump serve in the research sample.

Research fields:

- **The human field:** The volleyball team of Misan Governorate, which number (10) players.
- **The time field:** 9/7/2021 to 20/10/2021.
- **The place field**: Martyr Hall (Wissam Oreibi), Misan Governorate.

Methodology

Research Methodology

The appropriate approach is one of the most important steps that lead to the success of the research, as the approach depends on the nature of the problem and the goal to be achieved (Sovacool, Axsen & Sorrell, 2018), so the researcher used the descriptive approach in the correlational study, which aims to determine the degree of relationship between two or more variables (Seeram, 2019).

The research community:

The research community was selected by the intentional method of (10) players representing the volleyball team of Misan Governorate.

Means of collecting information, equipment used, and research tools:

- Arabic and foreign sources.
- Personal interviews with experts and specialists.
- Self-observation by the researcher.

- Data dump forms.
- Volleyball balls (10)
- Casio cameras (3)
- Laptop (HP)
- Handy calculator.
- Scale drawing length (1) meters.
- Measure tape.

Research tests:

1. **The kinetic synchronization of the striking arm and the rising foot:** It is the time difference between the moment of the first movement of the striking arm and the moment of raising the rising foot during the striking phase, bearing in mind that the shorter the time difference, the greater the agreement between the striking arm and the rising foot, thus increasing the serve speed.
2. **The length of the rising step**: It is the horizontal distance confined between the point of contact of the back foot with the ground to the point of contact of the front foot with the ground.
3. **The rising step time**: It is the time it takes to perform this step.

Service Accuracy:

Test name: Accuracy test for the skill of the top-facing passing in volleyball (Terfe, 2013: 390-392). Before starting with the details of the test, it was presented to experts to verify and agree on its validity.

The purpose of the test: to measure the accuracy of a passing directed from above.

Tools: the volleyball court is legal, 10 balls, a metric scale, a grid that defines the passing area, the second half of the court draws two lines parallel to the first side line 4 feet from the side line, and the second at a distance of 6 feet from the first line (10 feet away) from the other side. Written in the first rectangle No. (10) and in the other rectangle No. (5) as well as in the third rectangle No. (1). These numbers represent the degrees of the laboratory as the ball fell in any of these three areas

Field Research Procedures

Exploratory experience:

The exploratory experiment was conducted on 15/7/2021 at three o'clock in the afternoon and at the martyr hall (Wissam Oraibi) in Misan Governorate, where the number of the sample of the exploratory experiment was from the same research sample and their number was (3) players, and the aim of that experiment was to identify Obstacles and difficulties that the researcher may encounter during the main experiment and identify the safety of the devices and tools used in the tests

The main experiment:

The tests were applied to the research sample on 20/7/2021 at exactly three o'clock in the afternoon at the Martyr Hall (Wissam Oreibi) in Misan Governorate, and after the test was explained to the research sample, six attempts were given to each player in order to obtain accuracy in the serve and through video filming for these attempts, the kinematic variables under study were extracted.

Videotaping:

The filming was done with (3) Casio cameras, the first one placed on a tripod at a distance of (5) meters to the right of the players, while the second camera is also (5) meters to the left of the player, as the height of the two cameras was about (1.30 meters) from the ground. It is perpendicular to the middle of the average distance of the serve for the last five steps, while the third camera is at a distance of (10) meters at the beginning of the seating and at a height of (3) meters to photograph the movement of the ball sent from the moment of the serve to touch the ground. A drawing scale with a length of (1m) was used, and it was filmed at the midpoint of the movement track of the performance, and after all the attempts of the sample were filmed, those video clips were transferred to a hard disk and then to a laptop computer and were analyzed using the (Kinova) program and extracting the variables (Rising step length, rising step time, ball launch speed).

Statistical means

The researchers used some laws from the statistical program (SPSS) as follows:

Presentation, analysis and discussion of the results:

Presenting and analyzing the results of the tests for the research sample and discussing them:

Presentation and analysis of the results of the descriptive statistics of the movement synchronization difference, kinematic variables, and achievement of the research sample.

Table 1: It shows the results of descriptive statistics on kinematic variables and serve accuracy

No	Variables	M	SD
1	**Synchronous Difference**	0،298	0،047
2	**Step Length**	1،40	0،12
3	**Step Time**	0،24	0،02
4	**Accuracy**	61.1	2.96

According to Table (1), we find that the results of the movement synchronization difference between the striking arm and the rising foot, it is clear to us that the arithmetic mean was (0.29) part of a second, with a standard deviation of (0.047) In the length of the rising step, the mean was (1.40) meters, with a standard deviation of (0.12). As for the time of the rising step, the arithmetic mean was (0.24) part of a second, with a standard deviation of (0.02)

Presenting and analyzing the results of the correlation between research variables and achievement tests and discussing them:

Table 2: Shows the results of the correlation between the difference in movement synchronization and kinematic variables, and the accuracy of serve

No	Variables	Correlation	Indication
1	**Precision with diff sync**	0.78	0.02
2	**Accuracy and step length**	0.86	0.00
3	**Accuracy and step time**	0.81	0.00

Active at the level of indication (0.05).

By looking at Table (2), we find that the value of the correlation coefficient (C) between the achievement and the movement synchronization of the aiming arm with the fulcrum reached (0.78), with a level of indication (0.02), which is smaller than (0.05), which indicates The direct (positive) relationship between the accuracy of the serve and the synchronization of the movement of the striking arm and the rising foot, the less the time difference between the two movements, there was a development in the serve, and this comes through the lack of loss of the movement momentum that the player who serves gains during the pre-performance stages, as this characteristic is important in Controlling the final speed through proportionality with the goal of the movement performance of the skill and its path, and that increasing the speed is necessary to obtain the best performance and accuracy in the serve (Jary & Khalaf, 2022). Referring to Table (2), we find that the value of the correlation coefficient between accuracy and step length amounted to (0.86), with a level of indication (0.00), which is less than (0.05), which indicates that the relationship is direct (positive), meaning that the lower the step length, the player is able to transfer the amount of movement of the two legs to the torso and the striking arm, which reflects positively on the accuracy of the serve (Shihab, Jabbar & Zaalan, 2021). The researcher finds that the angular velocity of the torso works in the stage of pulling it back and then hitting the ball. The torso works like a taut arc, as the energy generated by pushing the earth is stored in this arc, then it turns into kinetic energy that is exhausted in the ball

and the synergy of mechanical power. This process is calculated by the equation that depends on time. Height and mass of the player as well as the vertical attraction of the ground to the center of mass of the body (Mekuriyaw, 2022), and thus the study of the two variables together explains the amount of speed that the ball gains, and the researcher does not eliminate the role of other biomechanical variables that contribute to the speed of launching the ball

As for the value of the correlation coefficient between the serve accuracy and the step time, it was (0.81), with a level of indication (0.00), which is less than (0.05), which indicates that there is a direct positive correlation between the step time and the serve accuracy, meaning that the less the step time its speed increased, and thus the amount of its movement increased, which reflected positively on the accuracy of the serve (Fuchs et al., 2019).

Conclusions

1. The less the movement synchronization between the striking arm and the rising foot during the serve phase, the more this is reflected positively on the accuracy of the serve, and this is evident through the positive correlation between them.
2. The variable of step length and time has a positive effect on the serve accuracy through the positive relationship between them.

Recommendations

1. The need to apply consensual exercises that focus on developing the research variables and linking them to skill, with the use of helping tools to develop the accuracy and speed of serve
2. Emphasis on training the tennis serve with different tools, such as added weights or reels with more weight than the legal balls of the striking arm.

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