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DOI: http://doi.org/10.36295/ASRO.2021.24608

The effect of rapid strength exercises for the core muscles in developing the jumping force, speed and accuracy of the spike serve skill of advanced volleyball players

Dr. Abdullah Hameed Saleh Al-Thubaini[1*]

1. The General Directorate of Education, Al-Anbar, Iraq

*Corresponding author: *Abdullah23@gmail.com*

Abstract

Rapid strength exercises for the muscles of the trunk and abdomen were addressed using methods and special training methods for these muscles and the skill of volleyball crushing is one of the skills that depend mainly on the speed of arm movement and the force of jumping or strength The momentary at the moment of advancement, which is therefore on the speed of the players' body, which requires investing the movements of the various parts in order to find a distinctive kinetic transmission. The research problem arises through a decline in the level of performance of the skill of the spike serve service at the level of advanced players in our country compared to what the players achieve in other countries in international and continental tournaments For the youth category, the experimental approach is used for its suitability to the nature of the problem. The research sample consisted of (14) applicants divided into two groups, and the pre-tests were conducted. The researcher used rapid strength exercises for the trunk muscles using special means and tools, then the post tests. Developing the speed and accuracy of the crushing skill of young volleyball players.

Keywords: Deep core, training and spike serve

http://doi.org/10.36295/ASRO.2021.24608

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Volume/Issue: Volume: 24 Issue: 06

Introduction

The sports training process aims to reach the athletes to the highest levels in achievement, and the training programs differ according to their requirements, in performance and competition. Developing the athlete's training status, in line with those requirements. Modern training is characterized by relying on subtle specialization in order to know the progress in training programs, especially the use of special training methods and methods. The skill of spike serve volleyball is one of the skills that depend mainly on the speed of arm movement and on the jumping force or momentary force in an instant The advancement and accuracy of performance, as it requires investing in the movements of the various parts in order to find a distinctive movement transfer such as jumping force and the speed of movement of the feet and transfer it to the player's arm, and this skill is characterized by special technical performance, and mechanical conditions that form the movement method for this performance.[1] Developing the supporting and supporting muscles for this skill by trying to link strength and speed exercises for all muscles of the body participating in the basic performance and assistance and the muscles supporting this skillful performance and the performance of movement in a smooth and accurate movement transfer. Hence the importance of research using rapid strength exercises that target the deep muscles of the player's torso (Abdominal and back muscles) which have an important and supportive role in the movement of players up and the performance of the dorsal arch and great importance in Maintaining the balance of the player's body during rapid movement and rapid stopping, as well as protecting the internal organs of the body as these muscles are the main center or axis for the movements of the arms and legs as the deep muscles contribute to stabilizing

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DOI: http://doi.org/10.36295/ASRO.2021.24608
the back and pelvis and transferring the motor speed from the legs to the movement of the arms as well as it gives the strength needed by the trunk In most movements and exercises, as well as good training of those muscles with rapid strength exercises, it will increase the ability of the players to perform other skills, raise the amount of strength and control directions, and work to raise the technical level and obtain the highest skill performance. Preparing quick-strength exercises for the core muscles to develop the jumping force of the working muscles the moment they rise and know the effect of these exercises on the accuracy of the crushing skill of young players.[2]

Through the researcher's field experience in the field of training, especially in the volleyball game, he noticed that there is a decrease in the performance of the spike serve skill at the level of applicants in our country compared to what the players achieve in other countries in the international and continental tournaments of the category of applicants, and this case attracted the researcher's attention and may be due to several reasons, including Weakness in the physical abilities, especially the jumping power of the muscles of the legs, the movement of movement and its flow and the movement of different organs quickly, for the working muscles or the chock muscles of the trunk, then to the hands and the importance of these abilities to the players, and the relationship of these variables to the skill of the crushing service that requires them to reach the highest point to get rid of defense and guidance The ball is accurate and know the extent of its impact on performance. All this gave the researcher a problem through there is a weakness in the flow of movement between the legs, the trunk and the hands, so try to resort to using rapid strength exercises for the muscles of the trunk (abdomen and back) to develop this skill, which will help in trying to avoid weaknesses during the kinetic performance of the skill of the crush.

Research objectives

1. Preparing exercises for the deep core muscles (abdomen and back) for volleyball players for the advanced category.
2. Knowing the effect of these exercises for the deep core muscles (abdomen and back) of the advanced category in developing the jumping force and the crushing accuracy of volleyball players.

Research hypotheses

1. There are statistically significant differences between the results of the pre and post-tests of the research sample, the development of the jumping force of the legs and the speed and accuracy of the ball with an spike serve dispatch of the research sample.
2. There are statistically significant differences between the control and experimental groups in the post-tests, in favour of one of the two groups.

Research fields

- The human field: (16) A player from Al-Sinaa Club
- Time: For the period from 4/10/2019 to 14/5/2019.
- Spatial field: Iraq - Al-Sinaa Club.

Research Methodology

Since the research problem is experimental, the researcher has used the experimental method to suit the nature of the problem.

Research community and sample

The research community was determined by the deliberate method of advanced volleyball players and its sample was chosen randomly, as the Industry Club was selected by lot and the research sample consisted of (16) volleyball players aged (21-23 years), and those who were regular in the

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Industry Club training, were male because the aims of the research It requires the use of athletes who are proficient in the technical performance of the game, and they represent the research community honestly. To know the normal distribution of the sample, the researcher used the coefficient of torsion as shown in Table (1 and 2)..

Table 1. Show the homogeneity of the research sample by the coefficient of skewness in some anthropometric measurements understudy

S	Variable	Units	Mean	SD	Median	Skewness
1.	Age	Year	21.928	0.828	22	0.145
2.	Mass	Kg.	76.857	5.432	75	0.356
3.	Length	Cm	184.714	4.905	185	0.092

Table 2. Show normal distribution in some of the special measurements under consideration

S	Variable	Units	Mean	SD	Median	Skewness
1.	Explosive force	N	601.75	12.551	601	0.087
2.	Ball speed	Meter/Sec.	22.281	1.365	22,5	0.347
3.	Spike serve	Degree	13.812	1.167	14	0.125

At a degree of freedom (12) and a level of significance (0.05).

Table 3. Show equivalence between the two groups was the special measures under consideration

Variable	Control group		Experimental group		(t) value	Error level	Type of significance
	Mean	SD	Mean	SD			
Explosive force	599.37	12.39	604.12	13.07	0.746	0.468	No sig.
Ball speed	22.437	1.116	22.125	1.642	0.445	0.663	No sig.
Spike serve	14	1.488	13.625	1.060	0.629	0.539	No sig.

Means of collecting information, devices and tools used in the research

1. Weights added
2. Varied balls
3. Medicine balls
4. A tape measure.
5. Chinese-made Dell laptop calculator model n5110.
6. Electronic balance.
7. Force Platform (Zebrice), (German-made).

Measurement and testing

Overhead test (4: 206)

- The purpose of the test: Measurement of the accuracy of the skill of the high radial crushing transmission

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- Hardware and tools:10 volleyball, a volleyball court, two exercise boxes, one of which is spike serve d in the corner of the field so that its internal angles are 5 cm away from the side and end lines,
- Performance specifications: The laboratory performs the overwhelming dispatch from the back line. The laboratory must perform (10) attempts. The laboratory counts the correct attempts in the (10) attempts assigned to him according to the registration rules

Register:

- 4 points for every correct spike serve that the ball falls on the rank.
- 3 points for every correct spike serve that the ball falls into the designated area.
- 2 points for each correct spike serve serving in which the ball falls in Zone A or(B) .
- 1 point for every correct spike serve the ball falls into (C).

Research measurements

1. Force jumping Measurement: The Force Plate Form of German origin, type (Zebras), has dimensions (150 x 50) cm and height (2) cm, after recording the attempt, the data is transferred to the (Excel) system and the time corresponding to the highest strength is extracted and the first time recorded for a request is subtracted from it. The result of the force-time extracts the maximum force: it is the largest force that the player spike serve s on the platform of the force from the moment of reliance to the moment of leaving the platform in the stage of the rise and is calculated in units of (Newton) and spike serve d at a distance of (40) cm from the sideline and (20) cm from the area line The front edge, and its front edge, was in contact with the front area line, and in the diagonal spike serve strike, it deviated by (40) degrees towards the inside of the stadium, and to adjust the direction of the platform with the angle of the spike serve striking diagonally.[4]
2. Measuring the speed of the ball: The researcher used an (American-made Sports Radar) device to calculate the speed of the ball, and the device contains a start button and the device calculates the speed (in miles or kilometres), and the result of the speed calculation appears on a screen facing the person holding the device, and its work begins by pressing the start button to calculate the speed at The first until the moment the ball hits the ground and leaves the speed calculation start button.[5]

Pilot study

To pay attention to the accuracy and correctness of performance and to avoid the difficulties that may occur during the field experiment procedures, the researcher conducted a first exploratory experiment on (2019 / 4 / 10) at four o'clock in the afternoon in the Al-Sinaa club on a group of young players where distances and dimensions were fixed, devices worked and all aspects Test and measurement.

Pre-tests for the research sample

The pre-test was conducted on the research sample at 4 pm on Thursday, 12/4/2019 in the Al-Sinaa Club Hall after preparing the forms for the names of the players, to facilitate work and record the results obtained by each player with the preparation of the necessary tools for the test, setting the devices and carrying out the test Before players.

The main experience

- The training exercises prepared began on 4/14/2019 and continued until 6/16/2019.

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- The implementation of the training curriculum took (8) weeks, with (3) training units per week (Saturday, Monday, and Wednesday), meaning a total of (24) training units during the research period.
- The experimental group performs rapid strength exercises in the main part of the training unit prescribed by the trainer and lasts from (20-30) minutes to a group of games, which are exercises for the deep muscles in the trunk (back and abdomen) using various Swedish and medical tools and balls to develop the strength of these training muscles.
- The experimental group performs deep muscle exercises after performing the main part of the training unit prescribed by the trainer and lasts from (15-25) minutes, consisting of two or three groups of exercises, which are exercises for the deep muscles in the trunk (back and abdomen) using various Swedish and medical tools and balls to develop Strength training for these muscles
- The researcher took into account the training curriculum prepared by the trainer and the training phase when developing exercises for the research sample, the tools used, the method of implementation and the economic conditions, and this is a set of exercises from the auxiliary exercises that work with the auxiliary muscles
- The use of the Swedish ball in some exercises targeting the muscle of the multifidus in the back as well as the internal abdominal muscles as well as the use of the pulleys in training to strengthen the inner abdominal and back muscles and the use of body weight in exercises that target the inner abdominal and back muscles by relying on the arms, separating the stomach and pulling it to the rib cage and using Rubber cord
- The total training units total (21) training units.
- Work with the experimental group was limited during the time allotted by the main department.
- The remaining time of the training unit that the experimental group works with the team coach.

Post-tests

The post-test was carried out on the research sample at 5 p.m. on 4/6/2019 in the same hall, and the researcher was keen to provide the same conditions and requirements in which the pre-physical tests were conducted.

Results and discussions

Table 4. Shows the value (t) calculated for comparison between the pre and post-tests for the control group

S	Variable	Units	Pretest		Posttest		Mean diff.	SD diff.	(t) value	Moral value	Indication of differences
			Mean	SD	Mean	SD					
1	Explosive force	N	599.37	12.39	606.875	12.877	7.50	2.927	7.246	0.000	Sig.
2	Ball speed	Meter/ Sec.	22.437	1.116	23.062	1.116	0.625	0.353	5.001	0.002	Sig.
	Spike serve	Degree	14	1.488	15.250	1.488	1.250	0.707	5.000	0.002	Sig.

Degree of freedom (6) and error level (0.05).

Table 5. Shows the value of (t) calculated for comparison between the pre and posttests of the experimental group

S	Variable	Units	Pretest	Posttest	Mean	SD diff.	(t)	Moral	Indicati

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			Mean	SD	Mean	SD	diff.		value	value	on of differences
1	Explosive force	N	604.12	13.07	621.50	11.58	17.375	7.781	6.315	0.000	Sig.
2	Ball speed	Meter/Sec.	22.125	1.642	24.312	0.997	2.187	1.032	5.990	0.001	Sig.
	Spike serve	Degree	13.625	1.060	16.750	1.035	3.125	0.353	25.0	0.000	Sig.

Degree of freedom (6) and error level (0.05)

The results of the table (4 and 5) showed that there is an improvement in the explosive power of the two legs, the speed of the ball and the accuracy of the spike serve hit. The nature of its performance and with the general form of performing specialized skills leads to better results. The exercises focused on exercises that tend to focus on the muscle groups of the skill of spike serve striking and their correct path and in a way that the economy believes in effort and ensuring the smoothness of movement. As, "The skill is a characteristic of a function of the effectiveness of performance and the development of the motor responses of the learner means organizing and arranging the work of the muscle groups in the direction of movement" [6]. Basically on the type of the educational unit and the training mission, ",[7] therefore, the results of the exercises were reflected on these indicators and the results were logical.

Table 6. Shows the differences between the experimental and control groups

Variable	Control group		Experimental group		(t) value	Error level	Type of significance
	Mean	SD	Mean	SD			
Explosive force	606.875	12.877	621.50	11.58	2.388	0.032	No sig.
Ball speed	23.062	1.116	24.312	0.997	2.362	0.033	No sig.
Spike serve	15.250	1.488	16.750	1.035	2.341	0.035	No sig.

At a degree of freedom (12) and a level of significance (0.05)

The results of Table (6) showed that there is an improvement in the explosive power of the two men and the speed of the ball launch and the spike serve of the experimental group at the expense of the control group. The flexibility of the trunk muscles (abdomen and back) that led to the development of the work of the core muscles and thus the spike serve movement and the force of the blow, as well as the investment of the jumping force, which made the differences in the values of this variable tending to the experimental group at the expense of the control group in the level of strength and speed of these muscles, which shows its importance In the elevation stage, where the relationship between the momentum and the vertical acceleration momentum must be optimal, as this skill requires speed in movement and force in hitting the ball and directing the ball to the plspike serve far from control.[8] The jumping force is one of the factors that mainly affect the rise to the top, And is of importance to achieve the optimum relationship between payment and accuracy of performance. And here Engle horn says, "One of the most interesting cases in the mathematical field is when it requires both accuracy (timing or location), and speed (such as spiking) within the same task or the same timing" [9]. The strength of the special muscles of the abdomen and back, showing a high movement flow and moving the locomotive, the locomotors transmission is one of the most important motor indicators that enable the player to improve his performance as it increases the acceleration of the body during the range of motion.[10] The movement of the part assigned to accomplish the duty does not start from scratch Rather, it starts from the end of the first movement, so it is one of the most important indicators of mathematical movements.[11] " The faster movement sometimes makes the individual more accurate, so moving quickly and accelerating at this speed makes you more consistent in The timing of the movement, the faster may be the best if the skill requires us to move quickly in the first plspike serve .[12]

Conclusions

1. The adoption of rapid strength exercises for the core muscles works to develop the jumping strength of the legs for advanced volleyball players
2. The adoption of rapid strength exercises for the core muscles works to develop the ball speed for the crushing skill of the advanced players in volleyball.
3. The adoption of rapid strength exercises for the core muscles works to develop the precision of the spike serve skill of advanced volleyball players.

DOI: http://doi.org/10.36295/ASRO.2021.24608

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