

أثر تمارين الجذع والطرف العلوي باستخدام بعض الأدوات على متطلبات القدرة العضلية ومستوى إنجاز الإرسال من أعلى لدى منتخب الفتيات للكرة الطائرة بجامعة الأقصى.

د. محمد حسين إبراهيم العجوري

أستاذ التربية الرياضية والبدنية المساعد - جامعة الأقصى - غزة

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The Effect of a Training Program for Developing Muscle Power Using Some Tool Exercises to Improve the Level of Achievement

Dr. Mohammed H. E. Alajjuori

Assistant Professor of Physical Education and Physical Training – Al-Aqsa University – Gaza

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ABSTRACT:

This study aimed to identify The effect of a training program for developing muscle power using some tool exercises to improve the level of achievement for girls' volleyball team at Al-Aqsa University. The researcher conducted an experimental study on a sample of (11) female students of the girls' volleyball team at Al-Aqsa University, consists players. The training period was six weeks, with three weekly trainings, in which exercises targeting the muscles of the core and the upper limb were used in the application of a skillful physical program in the manner of high-intensity interval training. To try to improve the muscular ability and the skillful Level of Overhand Serving performance by using several resistance tools, the researcher used the application on one group in both pre and post measurements, to reach the aim of the research.

The researcher used a number of prepared and pre-qualified physical and skill tests to obtain the results of the research, which were treated statistically using (mean, standard deviation, correlation coefficient, Cohen's effect size, multiple regression, and improvement rate between the pre and post measurements). Statistically significant differences between the pre and post measurements at the level of $\alpha \geq 0.05$ for the effect of core and upper limb exercises on a requirement (muscular capacity of the core, muscle capacity of the upper limb, and the level of overhand serving performance) of the girls' volleyball team at Al-Aqsa University in favor of the telemetry. Also, there was a statistically significant effect at $\alpha \geq 0.05$ between the level of muscular power for both the core and the upper limb on the one hand, and the skill of transmitting from above on the other hand.

The researcher recommended that it's very important to use exercises with tools because of their positive impact on the muscular ability of the core and the upper limb, and the application of exercises with tools for both the core and the upper limb on the junior category as well because of their active role in improving the muscle capacity needed by the basic skills of volleyball, overhand serving performance, the crushing serve and the offensive hit because they need almost the same physical characteristics.

Introduction:

Volleyball is one of the popular games for all segments of society, which spreads among its practitioners the spirit of competition between the two teams, and requires special skills, these skills require physical requirements that contribute to achieving it at the best level, and among the most important of these skills are the transmission and crushing skills, which are among the most important offensive skills in scoring points. (Okor, 2011: 3)

The core is considered one of the most important parts of the body that contributes to the performance and motor duty, as it represents the largest parts of the body in terms of mass and size and represents about 50% of the body weight. The point of the body's center of gravity, whether in fixed or moving positions, is located in the perimeter of the core; Therefore, any movement made by the limbs will have an effect on the core, and vice versa is also true, as any movement made by the core is greatly affected by the limbs, in addition to the fact that the largest muscle groups and masses are located in the core area, where large and strong muscle groups such as the back and abdominal muscles are concentrated around it. the core originates from the muscles of the shoulder girdle; Which gives them an amount of strength that can be demonstrated when both the core and the upper limb participate in one movement performance. (Syed, 2020: 2)

Oliva (2020) indicates that exercises for the core are used to stimulate the muscles in the core area to maintain the strength of the spine, shoulder girdle, and arms. This muscle group includes the abdominal muscles, the spine, as well as the pelvic muscles.

Most of the offensive volleyball skills aim to reach the highest point in the vertical plane, as all the motor transfer operations for the majority of volleyball skills take place from the core to the upper limb; Therefore, it can be said: The core is the main axis for the completion of the motor duty, and this necessitates that the volleyball coach pay special attention to the core exercises, and even gives it utmost importance in his training program, and (Al-Sayed, 2006: 15) indicates that the skill of serving is the second most important offensive skill - in volleyball - and the most important in scoring after the offensive hitting skill.

The requirement of muscular ability is one of the most important The physical capabilities of the volleyball player are the most important of all, and it is considered the first and essential element of the skill of serving, and it represents a strong addition to that skill and a decisive factor in its achievement and the excellence of the players in its performance.

Based on the foregoing, and given the importance of muscular ability and its impact on the level of skillful performance of volleyball players and overhand serving performance in particular; The researcher decided to carry out this study in order to identify the effect of core and upper extremity exercises - using some tools - on the requirement of muscular ability and the level of serving from above for the girls' volleyball team.

The study Problem:

The researcher noticed through his work as a trainer and lecturer at Al-Aqsa University that the presence of major failures and many common mistakes among the girls' team of Al-

Aqsa University in the skill of sending from above while leading the universities championship hosted by his university on its soil in 2022 and the researcher ruled out that these failures and mistakes are due to fear, tension or poor preparation

In a regular analytical study of the matches; It turned out that approximately 27% of these mistakes were (the inability of the players to deliver the ball to the court of the other team), as the balls bounced off the net, and the rest of the errors were distributed over the performance technique, such as: (mistakes of throwing the ball, whether near or far, and mistakes hitting the ball was related to the shape of the hand) and other fouls that led the server to change the position of the extension, lack of control of the ball, lack of extension of the body and arm while hitting, insufficient weighting of the striking arm, and other fouls that were due to significant weakness in the muscles of the core and upper limb according to what was stated in the match analysis form, and from here the researcher decided to carry out this study in order to strengthen the muscles concerned and address the problem of serving from above by designing a resistance program based on exercises for the core and upper limb using some tools - as an attempt to improve the requirement of muscular ability - and then improve the level of achievement for the skill of sending from above for the girls' volleyball team at Al-Aqsa University.

With emphasis on the scarcity of research and studies that dealt with all these factors through research and study; The researcher decided to prepare his experiment on the girls' volleyball team at Al-Aqsa University, so the researcher formulated the problem of his current study with the following main question:

What is the effect of core and upper limb exercises using some tools on the requirement of muscular ability and the level of overhand serving performance for the girls' volleyball team at Al-Aqsa University?

From the previous main question, the following sub-questions emerge:

1. What is the effect of core and upper limb exercises on the muscle power requirement of the core?
2. What is the effect of core and upper limb exercises on upper limb muscular power requirements?
3. What is the effect of core and upper limb exercises on the level of overhand serving performance?
4. Is there a statistically significant relationship between the level of muscular power for both the core and the upper limb, and overhand serving performance in volleyball?

The importance of this study:

The importance of this study is evident in the following points:

Firstly: Scientific Importance:

- The current study is considered a new scientific addition in the field of volleyball, as it is the first of its kind, especially in Palestine - to the extent of the researcher's knowledge.
- This study is considered innovative and depends in its implementation on resistance exercises using tools that simulate the muscles of the transmission skill from above, starting from the muscles of the core, passing through the muscles of the shoulder girdle, and ending with the muscles of the arms.

- This study is considered an organized scientific attempt to raise the level of female volleyball team players at Al-Aqsa University, which may provide an opportunity to generalize the experiment (program) on other samples in the future.

Secondly: Practical Importance:

The applied importance of the current study lies in the possibility of benefiting from it by coaches and those interested in the field of women's volleyball, through using the program or modifying it to suit the condition of their players to try to achieve the best levels.

- The applied importance of the current study lies in the possibility of directing the attention of researchers to address such topics, especially in Palestine, due to the lack of it in this field, especially the category of girls.

- The researchers in the field of sports, especially volleyball, benefit from the current study by using the tools that were used for the purposes of the current study.

Purpose of the study:

The current study sought to identify the effect of core and upper extremity exercises using some tools on the requirement of muscular ability and the level of completion of the serve from above for the girls' volleyball team at Al-Aqsa University.

In order to achieve the main objective of the study; The researcher conducted a six-week experimental study with three weekly exercises in which he used exercises that target the muscles (core and upper extremity) in the application of a skillful physical program by the method of high-intensity training in an attempt to improve the muscular ability and the skillful achievement of serving from the top of stability "tennis" for the players of Al-Aqsa University for volleyball, the proposed

program included exercises in which the researcher used the following tools: (rubber elastic bands, dumbbells, bent iron bar, weights, wall ladders, Swedish seat, resistance hand grip, rollers, rubber fist ball, rubber hand rings, bendable spiral bar, The hanging ball, the medical ball weighing 1 kg, 3 kg and 5 kg) and the exercises were individual and pair using tools and the ball, and the researcher used the application on one group in both pre and post measurements, to reach the aim of the study mentioned above.

Study hypotheses:

The current study seeks to validate the following hypotheses:

- There is a statistically significant correlation between the level of muscle power for each of the core and the upper limb, and overhand serving performance in volleyball.

- There are statistically significant differences between the pre and post measurements at the level of $\alpha \geq 0.05$ for the effect of core and upper extremity exercises on the requirement of the muscular ability of the core for the girls' volleyball team at Al-Aqsa University (experimental group) in favor of the post-measurement.

- There are statistically significant differences between the pre and post measurements at the level of $\alpha \geq 0.05$ for the effect of core and upper limb exercises on the requirement of muscular capacity for the upper limb for the girls' volleyball team at Al-Aqsa University (experimental group) in favor of the post measurement.

- There are statistically significant differences between the pre and post measurements at the level of $\alpha \geq 0.05$ for the effect of the core and upper limb exercises on the level of achievement to serve from above for the girls' volleyball team at Al-Aqsa University

(experimental group) in favor of the post-measurement.

Terminology of study:

Core and upper limb exercises:

The exercises used to develop the muscular strength of the muscles of both the core and the upper limb, which includes the muscles (the back and abdomen from all directions, the shoulder girdle, and the arms) with the aim of achieving the strength of the skill of sending from above for all muscle groups. (Empirical definition)

Muscular capacity:

(Meckel, 2005) defines it as the speed at which a muscle can contract and work against a maximum or less than maximum resistance and the muscle's ability to overcome the largest possible resistance

Importance of serving skill:

The skill of serving is one of the basic and important skills in the game of volleyball, as it needs control and mastery when executing, and the serve often seems easy to perform, but it needs a lot of training and practice in order for the player to reach a good level of performance, as he needs neuromuscular compatibility in addition to muscle strength (Yasser, 2016: 65).

Serving is also considered one of the basic skills in volleyball of an offensive nature. Through it, the player can start playing with an attacking strike through which she may achieve a direct point in favor of her team or make it difficult for the opposing team to block it, thus depriving them of forming a comfortable offensive sentence.

This is confirmed by (Kateb & others, 2014) that the serve is of great importance in the

match, as it is possible to obtain a direct point through it, or to make it difficult to attack the opposing team by using the strong and effective serve.

The skill of serving is difficult because it requires appropriate strength, high accuracy, and perfect timing to hit the ball and make the transmission mission a success. Therefore, it requires a lot of continuous training in order for the player to reach a good level of performance. That is why serving training has recently become a major part of the attention of volleyball coaches and the serve is the way to get points for the team if it is mastered, and it is considered one of the most important direct attack strikes that the player uses during the game, which may put the opposing team in a difficult defensive position.

The importance of the serve also lies in the fact that it is the most important skill, as the team cannot continue to score points without keeping it, so the volleyball player must realize that the serve is not just crossing the ball over the net, but rather she must master the performance of the serve in a strong and accurate way (Al-Dulaimi, 2013: 35).

This is in addition to taking into account the distance, height and place, and the sending team can score points through the serving player whose performance is independent and without influence from his teammates or the opposing team, and the greatest opportunity in volleyball is to develop the transmission skill, which is considered the most dangerous skill in the first moment to surprise him The opposing team has become the balance of superiority in recent years, which makes it imperative for coaches to prepare six distinguished players in the service if it wants to win the match (Muhammad Lamine & Hamza, 2020: 84)

The researcher's interest in this study focuses on the level of achieving the serve from above through the effect of the muscular ability of the core and the upper limb on it in the volleyball team players, as well as its extreme importance for the technical level of girls and its frequent use in university teams.

Objectives that can be achieved when performing serving:

Several goals can be achieved when performing a strong serve in volleyball matches:

- Score points directly.
- Thwarting the opponent's plans.
- Exhausting the energy of the best player on the opposing team by serving him; This is to weaken its performance.
- Serve to the weaker player on the opposing team to try to gain a point.

Effective serving skill performance criteria:

To perform the skill of serving effectively; The following criteria must be met:

- The strength and speed of the arm and the core when striking and the ability to coordinate movement between them (the ability of the core and the upper limb).
- Directing the balls on the opposing team's weaknesses (control).
- The correctness of throwing the ball up when performing the serve (skill). (Al-Dulaimi, 2013: 36).

Serving skill types:

The serve strikes can be divided into two main types according to the position of the ball in relation to the level of the player's shoulder, which are the serve from below, and the serve

from the top, and the serve from the top is divided into the following forms:

- Serve from above (tennis serve).
- Front wavy transmission (American).
- Wave side transmission (Japanese).
- Hook side transmission.
- overwhelming transmission.
- The undulating transmission from the jump (Al-Dulaimi, 2013: 37).

Kinetic performance of transmission from above:

It consists of the following steps:

Firstly: standby:

Where the distance between the feet is adjusted so that it is shoulder-width apart, and the feet are parallel or the foot of the opposite leg is advanced to the striking hand and the legs are stretched and the core is perpendicular to the pelvis, and the head is perpendicular to the core, while the arm is opposite to the striking hand carrying the ball in front of the shoulders, and the striking hand is above the ball.

Secondly: Throwing the ball to the top:

Control the timing in terms of the distance and proximity of the ball to the body, then throw the ball in front of the arm and shoulder of the striking hand at an appropriate height.

Thirdly: Arching the core, swinging the arm:

The player arches the core and swings the striking arm high behind, and the palm of the striking hand is hollow and takes the shape and size of the ball.

Fourthly: Multiplication and transmission:

The striking arm is bounced from the back forward, and the striking is done when the palm

reaches vertical above the shoulder so that the arm is extended from the elbow joint, as it requires controlling the timing to meet the ball at the right time and place. (Al-Jumaili, 2013: 39)

The importance of upper limb and core exercises:

Teeple & Bliss (2006) believes that core strengthening exercises have become the basis of training programs for athletes at all levels, where the core muscles work to connect the upper limb with the lower limb of the body, and the force resulting from the core is called the energy source for the limbs, and until the initial stability of the body occurs; this requires preparing a healthy spine, a healthy back, and a healthy abdomen, and this is done by strengthening the muscles of the entire core area.

Al-Amri (2014) confirms that it is necessary to pay attention to the exercises related to the core area in order to reach a good degree of physical fitness. Strong core muscles help to strengthen the body to perform any exercise that maintains body balance, in addition to that exercises to strengthen the core area are very important to prevent injuries. In this area, its muscles maintain the balance of the pelvis, thus the spine is in an appropriate position, and the balance of the center of the body is an indication of its ability to control the link between movements related to the upper and lower limbs of the body.

The researcher focused on studying the effect of upper limb muscle exercises because of their importance on the level of overhand serving performance. Javed et al. (2021) explain the functions of the muscles of the upper limbs are that they work to move the parts present in them and associated with them by converting the driving force of the bones into an effective

motor force that enables the player to use them in the form, strength, and direction he wants.

What confirms the importance of the upper limb muscles for volleyball players is what (Khalil, 2009) pointed out in his study, where he noticed that the players who suffer from an imbalance in the muscles of the upper limb have a shorter vertical jump distance than the other players; Which prompted him to address this problem, as his study aimed to identify the effect of improving the balance of the muscles of the upper limb on the vertical jump distance of volleyball players and the effect of this improvement on increasing the distance of the vertical jump. It is of great importance in improving the jump distance.

Research Methodology:

In this study, the researcher used the experimental approach in one group design, and conducted pre and post tests on the study sample.

Steps for design the training program:

The researcher conducted pre- and post-tests on the study sample, where he applied a skillful physical program by the method of high-intensity interval training as an attempt to improve the muscular ability and skillful achievement of serving from higher stability "tennis" for the players of Al-Aqsa University volleyball team, in order to identify the effect of core and upper limb exercises using some tools on the requirement of muscular ability and the level of overhand serving performance for the girls' volleyball team at Al-Aqsa University.

Study population:

Female students of the girls' volleyball team at Al-Aqsa University.

The study sample:

This study was conducted on a purposive sample of female volleyball team students at Al-Aqsa University, who participated in the 2022 Universities Championship, numbering (11) players. And that was in the physical exercise hall in the building of the major gymnasium in the Faculty of Physical Education and Sports - Al-Aqsa University - Khan Yunis branch, and the exercise program was applied using tools on them.

The limits of the study:

- **Objective limit:** It is the effect of core and upper limb exercises using some tools on the requirement of muscular ability and the level of overhand serving performance for the girls' volleyball team at Al-Aqsa University.
- **Human limit:** The girls' volleyball team at Al-Aqsa University, consists of (11) players.
- **Spatial limit:** the physical exercise hall in the Great Gymnasium building in the Faculty of

Physical Education and Sports - Al-Aqsa University - Khan Yunis Branch.

- **Time limit:** the first semester of the academic year 2022-2023.

Study variables:

1. Independent Variables:

- The skillful physical program that was applied in the current study.

2. Dependent Variables:



- Core muscular capacity.
- Muscular capacity of the upper limb.
- The level of overhand serving performance

Tools used for measurement:

Table No. (1) shows the requirements that were measured, the tests that were applied and the tools that were used in each test.

Table (1)

Physical requirements that been studied, tests that were applied and the tools were used.

Physical Requirements	Test	Tools	shape
Muscular capacity of core	Back Life Strength Test	Dynamometer	
	Throwing a medical ball (3 kg) to the farthest distance from standing	Medical ball (3 kg), tape measure, flat ground, chalk	








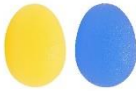







Muscular capacity of the upper limb	Throwing a medical ball (3 kg) to the farthest distance from high sitting	Medical ball (3 kg), chair, tape measure, level ground, chalk	
	Throwing a medical ball (1 kg) with one arm farther than sitting high.	Medical ball (1 kg), chair, tape measure, level ground, chalk	
The level of overhand serving performance	Accuracy of the transmission directed from overhand	Volleyballs (10), volleyball court	

Table (2) shows the tools were used in the training program and the shape of each tool.

Table (2)

Tools used in the training program of the current study.

Tool	shape	Tool	shape	Tool	shape
The rubber band		The wheel		Swedish seat	
Dumbbells		Rubber fist ball		Resistance hand grip	
The bent bar		Rubber hand rings		hanging ball	
Wall ladders		Flexible spiral bar		Medical ball (1 kg), (3 kg) & (5 kg)	

Evenness of data distribution:

Before starting the process of statistical analysis of the data, it must be ensured that it

follows a normal distribution, and data that does not follow a normal distribution are processed. Therefore, the Kolmorov-Smirnov test and the Shapiro-Wilk test were performed

as shown in Table (3) and Table (4); This is to ensure that the data is evenly distributed.

Table (3)

The arithmetic mean, standard deviation, Kolmogorov-Smirnov test, Shapiro-Wilk test, and the significance level of the pre-test of physical requirements.

physical requirements	Test	pre-test						
		Mean	standard deviation	Kolmogorov-Smirnov test	Sig	Shapiro-Wilk test	sig	Normal Distribution Condition
Muscular capacity of core	Back Life Strength Test	59.09	5.839	0.213	0.176	0.934	0.449	Follow
	Throwing a medical ball (3 kg) to the farthest distance from standing	380.45	18.091	0.173	0.200	0.905	0.212	Follow
Muscular capacity of the upper limb	Throwing a medical ball (3 kg) to the farthest distance from high sitting	308.18	9.020	0.183	0.200	0.956	0.718	Follow
	Throwing a medical ball (1 kg) with one arm farther than sitting high.	540	40	0.227	0.117	0.917	0.293	Follow
The level of overhand serving performance	Accuracy of the transmission directed from overhand	63.91	6.745	0.190	0.200	0.971	0.893	Follow

Table (4)

The arithmetic mean, standard deviation, Kolmogorov-Smirnov test, Shapiro-Wilk test, and the significance level of the post-test of physical requirements.

physical requirements	Test	post-test						
		Mean	standard deviation	Kolmogorov-Smirnov test	Sig	Shapiro-Wilk test	sig	Normal Distribution Condition
	Back Life Strength Test	71.82	7.833	0.172	0.200	0.950	0.645	Follow

Muscular capacity of core	Throwing a medical ball (3 kg) to the farthest distance from standing	412.27	17.799	0.187	0.200	0.880	0.105	Follow
Muscular capacity of the upper limb	Throwing a medical ball (3 kg) to the farthest distance from high sitting	331.36	7.775	0.206	0.200	0.937	0.482	Follow
	Throwing a medical ball (1 kg) with one arm farther than sitting high.	566.82	12.505	0.194	0.200	0.938	0.498	Follow
The level of overhand serve performanc	Accuracy of the transmission directed from overhand	74.18	7.360	0.200	0.200	0.947	0.605	Follow

It is clear from Table (3) and Table (4) that the levels of significance for all elements of physical abilities for the pre and post measurements were greater than 0.05, and this indicates that all data follow a normal distribution, and therefore scientific tests can be used to see if there are statistically significant differences. between the pre and post measurements and in favor of any of them.

Statistical methods used in the study:

In his current study, the researcher used the following statistical methods:

Arithmetic mean, standard deviation, correlation coefficient, multiple regression analysis, paired sample T test, Kolmogorov-Smirnov test, Shapiro-Wilk test, and Cohen's d.

Presentation and discussion of results:

In light of the statistical treatments and research procedures associated with the current study; the researcher presented, analyzed and discussed the results of his study, to prove the correctness of the procedures and answer all questions in order to reach the achievement of the general and main objective of the study.

Analysis and discussion of study questions:

- The effect size was calculated for the linked sample under study using Cohen's equation, which is considered an important measure of the practical significance of the statistical differences or relationships between the variables, and whether the significance is large, medium, or small. Table (5) shows The criterion adopted in the interpretation of Cohen's test to determine the size of the effect is as follows:

Table (5)

The standard used to explain Cohen's Effect Size (ES)

Large	Medium	Small	(Cohen's d)
0.8 and above	0.5 to less than 0.8	0.2 to less than 0.5	Effect Size (ES)

- Effect size values were calculated for each component of the physical requirements under study.

- The T-test was applied for correlated samples, and the correlation value was calculated between the pre and post measurements, and the improvement rate in the pre and post-performance was calculated.

Firstly: Results related to the first question:

The first question of the study states the following: **(What is the effect of core and upper limb exercises on the muscular capacity requirement of the core?)** The researcher applied the t-test for related samples and calculated the correlation value between the pre and post measurements, and improvement rate in the pre and post-performance was calculated, and the value of the effect size values for the muscular power requirement of the core, and table (7) shows this:

Table (6)

The difference between the mean of the pre and post measurements, improvement rate, effect size and correlation, t-test value, and significance level of trunk muscular power requirement

physical requirement	Test	Measurement unit	Pre-test	Post-test	difference between two means	improvement rate	(ES)	Correlation	T value	sig	Result
Muscular capacity of core	Back Life Strength Test	Kilogram	59.09	71.82	12.73	21.54%	0.22	0.805	9.037	0.000	Significant
	Throwing a medical ball (3 kg) to the farthest distance from	Centimeter	380.45	412.27	31.82	8.36%	0.28	0.944	17.50	0.000	Significant

It is evident from the previous table when looking at the effect size values, we find that its value is greater than 0.8, and this is a strong indicator of real and influential strong morale.

So; the researcher found a strong correlation between the averages of the pre and post measurements of the muscular ability requirement of the core, where the correlation value was greater than 0.5, and this is a strong

positive indicator of the correlation between the pre and post measurements.

The significance level of the t-test is equal to 0.000, which is related to the muscular power requirement of the core, which is less than 0.05 in both tests used, and this of course led to the following results:

There are statistically significant differences between the pre and post measurements at the level of $\alpha \geq 0.05$ for the effect of core and upper

limb exercises on the requirement of the core muscle capacity of the girls' volleyball team at Al-Aqsa University in favor of the post measurement, where the average capacity of the core muscles before the training program was 59.09 kg. However, after applying the training program, the average capacity of the core muscles became 71.82 kilograms in the test of the capacity of the core muscles, which means an improvement in performance that reached 21.54%.

In the medical ball throwing test weighing (3 kg) for the farthest distance from standing, the average capacity of the core muscles before the training program was 380.45 cm and became 412.27 cm after applying the training program, i.e. a change in performance that reached 8.36%, meaning that The muscular ability of the core improved to an acceptable degree after applying the training program using tools, and this result is consistent with the study (Mohamed, 2020), which aimed to identify the effect of core stability exercises on the degree of performance of some exercises with tools for students of the second year in the Faculty of Physical Education. The results of the study indicated To the superiority of the experimental group that used core stability exercises in developing physical abilities, the researcher also found agreement between his current study and the study of (Jabr, 2017), whose results showed that core stability exercises work to make the spine more stable in relation to resisting gravity during movement and contribute to the performance of The different types of movements in an optimal manner, the appropriate distribution of force and its absorption, and the reduction of the burden placed on the parts involved in the movement of the spine, as agreed by NET. The results of the current study with the study of shprawi (2011) confirmed that the training program

with the addition of core stability exercises in the special physical preparation part - which was applied to the experimental group - was more effective than the training without adding core stability exercises, which led to improving the level of some physical abilities The current study also agreed with the study of Sharma and Geovinson (2012), which aimed to know the effect of the core strengthening training program on the performance of the vertical jump and the static balance of volleyball players. Refers to the essential effect of the core stability training program, and this agrees with Lovelace opinion (2009) that the strength of the core area provides basic balance and stability of the body, which leads to the ease of movement of the core during the exercise of sports movements.

The researcher attributes the existence of a difference between the pre and post measurements to the effect of core and upper limb exercises on the muscular capacity of the core in favor of the post measurement to the use of core exercises, as the practice of core exercises led to an increase in the strength of the muscles of the upper back and lower back, as well as the muscles of the chest and abdomen, and strengthening the muscles of the core It improved the level of motor efficiency of the body during the performance of various movements, and also helps to increase body control and balance during movement, which greatly contributed to the development of the muscular ability of the core in line with the nature of movement and the requirements of muscular work and the direction of performance of the skill of serving from the top of "tennis". In the sport of volleyball, as well as what the research sample needs. The researcher also believes that the gradation of various exercises with different tools is from easy to

difficult. It increased the students' motivation to exert more effort and improve performance.

Secondly: Results related to the second question:

The second question of the study states the following: **(What is the effect of core and upper limb exercises on the requirement of muscular capacity for the upper limb?)** The

researcher applied the t-test for related samples and calculated the correlation value between pre and post measurements, and the improvement rate in pre and post-performance was also calculated. And calculating the value of effect size values for the requirement of muscular ability of the upper limb, and table (7) shows that:

Table (7)

The difference between the mean of the pre and post measurements, improvement rate, effect size and correlation, t-test value, and significance level of upper limb muscular power requirement

physical requirement	Test	Measurement unit	Pre-test	Post-test	difference between two means	improvement rate	(ES)	Correlation	T value	sig	Result
Muscular capacity of the upper limb	Throwing a medical ball (3 kg) to the farthest distance from high sitting	Centimeter	308.18	331.36	3.18	7.52%	3.09	0.608	10.241	0.000	significant
	Throwing a medical ball (1 kg) with one arm farther than sitting high.	Centimeter	540	566.82	26.82	4.97%	3.57	0.885	11.847	0.000	significant

It is clear from the previous table when looking at the effect size values, we find that its value is greater than 0.8, and this is a strong indicator of real and influential strong morale, as the researcher obtained the following results:

There is a correlation between the averages of the pre and post measurements of the requirement of muscular ability of the upper limb, as the value of the correlation is greater than 0.5 and this is a strong indicator of the correlation between the pre and post measurements.

The level of significance of the T-test is equal to 0,000, which is related to the muscle capacity requirement of the upper limb, which is less than 0.05 in both tests used, and this of course led to the following results:

There are statistically significant differences between the pre and post measurements at the level of $\alpha \geq 0.05$ for the effect of core and upper limb exercises on the requirement of the upper limb muscular ability of the girls volleyball team at Al-Aqsa University in favor of the post measurement, where the average upper limb muscular ability before the training program was 308, 18 cm, and after applying the training

program, the average muscular capacity of the upper limb became 331.36 cm in the medical ball throwing test weighing (3 kg) for the farthest distance from sitting high, with a performance change rate of 7.52%, while in the medical ball throwing test weighing (1 kg) with one arm for the farthest high seated distance; The average muscular capacity of the upper limb before the training program was 540 cm, and it became 566.82 cm after applying the training program, i.e. a performance change rate of 4.97%, meaning that the muscular capacity of the upper limb improved after applying the training program to an acceptable degree, and this result agrees With the study (Ali et al., 2016), the results of which confirmed the effect of special exercises in developing the explosive ability of the upper limbs and the accuracy of performing the long handling from above the shoulder.

The researcher attributes this improvement to the research sample in the results of the muscular ability of the upper limbs to the special exercises used, as it included various exercises for muscular ability and for most of the muscles in the upper part of the body in general and for the upper limbs in particular, and thus increasing the production of force for the muscles of the upper part as a natural result

of that improvement. In addition to giving these exercises at the right time from the time of the main section of the training unit, which led to a positive effect in developing the muscular capacity of the upper limb, and this is consistent with the opinion of (Shehata, 2019) that muscles are the source of movement in humans, because they are the source of strength It causes movement and depends on the performance of most sports activities, as individuals with muscular ability can score a higher degree in the output of movement related to their physical ability.

Thirdly: Results related to the third question:

The third question of the study states the following: **(What is the effect of core and upper extremity exercises on the level of achievement to send from above?)** The researcher applied the t-test for related samples and calculated the value of the correlation between the pre and post measurements, and the improvement rate in the pre and post-performance was also calculated. And calculating the value of effect size values for the level of achievement of the transmission from above, and table (8) shows this:

Table (8)

The difference between the mean of the pre and post measurements, the improvement rate, the effect size and correlation, the t-test value, and the significance level of overhand serving performance for sending from above

physical requirement	Test	Measurement unit	Pre-test	Post-test	difference between two means	improvement rate	(ES)	Correlation	T value	sig	Result
The level of overhand serving performance	Accuracy of the transmission directed	Points	63.91	74.18	10.27	16.07%	2	0.726	6.483	0.00	Significant

from overhand										
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It is clear from the previous table when looking at the effect size values that its value is greater than 0.8, and this is a strong indicator of real and influential strong morale, as the researcher obtained the following results:

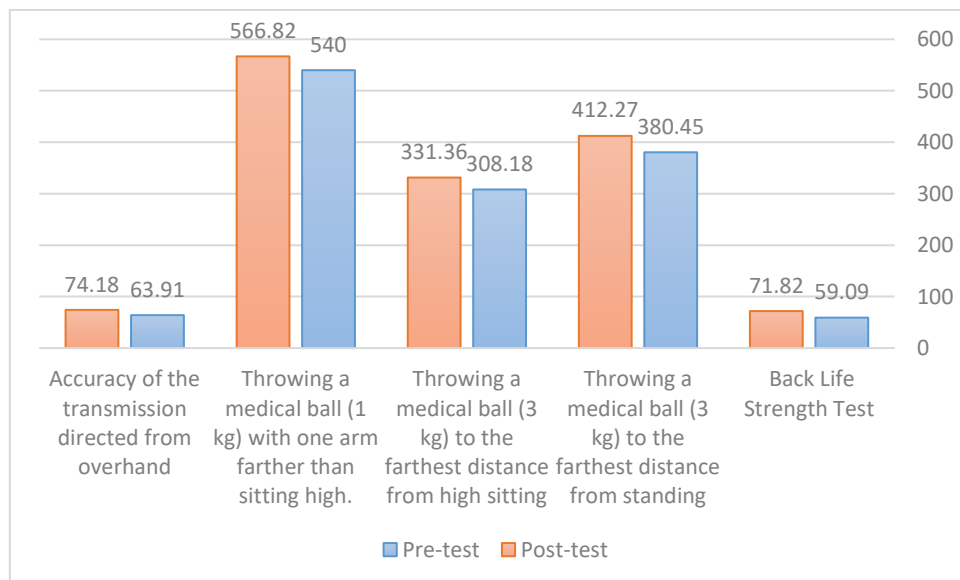
There is a correlation between the averages of the pre and post measurements of the level of achievement for sending from above, where the value of the correlation is greater than 0.5 and this is a strong indicator of the correlation between the pre and post measurements.

The significance level of the T-test is equal to 0,000, and the level of achievement for transmission from above is less than 0.05, and this of course led to the following results:

There are statistically significant differences between the pre and post measurements at the level of $\alpha \geq 0.05$ for the effect of core and upper extremity exercises on the level of overhand serving performance for the girls' volleyball

team at Al-Aqsa University in favor of the post measurement, where the average level of overhand serving performance before the training program was 63.91 points, but after applying the training program, the average level of achievement for sending from above became 74.18 points, i.e. a change in performance that reached 16.07%, meaning that the level of achievement for sending from the highest level improved after applying the training program to an acceptable degree, and this result agrees with The study of (Al-Shennawy & others ,2022), which aimed to identify the effect of core and shoulder stability exercises on the accuracy of the serving performance of female tennis players.

The following figure shows a graphical representation using columns of the averages of the pre and post measurements for all tests used to measure the physical requirements in this study.



It is clear from the previous figure the improvement in the average of the post-measurement in each test that was used to measure the physical requirements under study,

and this confirms the existence of differences between the pre and post measurements in favor of the post measurement.

Fourthly: Results related to the fourth question:

The fourth question of the study states the following: (Is there a statistically significant relationship between the level of muscular power for both the core and the upper limb, and overhand Serving Performance in volleyball?).

To answer the previous question; The following hypothesis was formulated: There is

no statistically significant relationship at the level of $\alpha \geq 0.05$ between the level of muscular power for both the core and the upper limb, and overhand Serving Performance in volleyball.

To test this hypothesis, the researcher used multiple linear regression, and the following table (9) shows that:

Table (9)

The results of the multiple regression analysis to reveal the existence of a relationship between the level of muscular power for both the core and the upper limb, and overhand serving performance

Independent variables	Regression coefficients	T value	Sig.
Constant	0.132	3.152	0.021
Core muscular capacity	0.657	2.541	0.032
Muscular capacity of the upper limb	0.525	3.643	0.033
0.706 = correlation coefficient		0.754 = Adjusted R square	
		0.032 = Sig	

The previous results show the following:

The correlation coefficient between the level of muscular ability for both the core and the upper limb, and the skill of overhand serving performance is equal to (0.706), and the probability value is equal to (0.032), which is less than 0.05, which means rejecting the null hypothesis, and accepting the existence of a statistically significant relationship between the level of The muscular power of both the core and the upper extremity, and the skill of serving from above.

The modified coefficient of determination is equal to (0.754), which means that (75.4%) of the change in the overhand serving performance can be explained through the linear relationship with the physical requirements (muscular ability of the core and upper limb), and this means that there is a

statistically significant effect between the level of abilities The physical and defense skill of serving from the top of "tennis", where the value of the total effect reached (75.4%), which is a good and statistically acceptable effect.

Based on the results of Table (9), the regression equation can be derived as follows:

$$y = B_0 + B_1X_1 + B_2X_2$$

Where y is the dependent variable, which is the skill of sending from above.

B_0 : is the constant, equal to 0.132

X_1 : core muscular capacity.

X_2 : muscular capacity of the upper limb.

$B_1 = 0.657$, which is the coefficient of the regression line and represents the slope of the straight line representing the relationship

between the muscular power of the core and the skill of sending from above.

$B_2 = 0.525$, which is the coefficient of the regression line and represents the slope of the straight line representing the relationship between the muscular ability of the upper limb and the overhand serving performance.

Given T values calculated for core muscular power requirement and upper limb muscular power requirement; It turns out that it is a function and effect on the level of the skill of serving from above, and here we conclude that there is a statistically significant effect at the level of significance $\alpha \geq 0.05$ between the level of muscular ability for each of the core and the upper limb, and the skill of serving from above, and from here it becomes clear to the researcher that the players possess physical requirements. The muscular capacity of the core and the muscular power of the upper limb positively affects the level of serving skill from above. The researcher explains that the female players possess the aforementioned physical requirements through improving the requirement of muscular power for both the core and the upper limb. Making the players able to perform more strongly, which made it easier for them to execute the serve from above without the trouble of connecting the ball as it was in the past, and thus they were better at collecting points when they were subjected to the same test after applying the force program that relied on the use of tools, and this result agreed with the study (Al-Dulaimi and Sabah, 2013), one of the most important results of which was the existence of a strong correlation between muscle strength and transmission accuracy.

Recommendations:

1- The need to use exercises with tools because of their positive impact on the muscular ability of the core and upper limbs, which contributed

to the development of overhand Serving Performance in volleyball.

2- Applying tool exercises for both the core and the upper extremity to the juniors as well, because of their effective role in improving the muscular ability needed by the basic skills of volleyball, especially the serve from above, the crushing serve and the offensive hit because they need almost the same physical characteristics.

3- Conducting more studies on other physical requirements and capabilities because of their great importance in developing overhand Serving Performance for volleyball players in particular.

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Attachments:

First test: addresses the first question

What is the effect of core exercises using tools on the muscle power requirement of the core?

Test name: Back Life Strength Test

Objective of the test: To measure the capacity of the posterior muscles of the core.

Tools used: Dynamometer.

Performance specifications:

- The tester stands on the base of the device, then bends the core forward and down slightly to hold the handle of the iron bar with both hands in an inverted manner, so that the back of one hand is outward and the other is inward.
- The length of the chain that connects the handle to the dynamometer is adjusted so that the angle of the core from the abdominal side is 100 degrees, and the legs are completely straight, which enables the tester to pull up from the core only.
- When the start signal is given, the tester pulls up with the hands so that the pulling movement is from the core and not from the legs, and the tension is with explosive force to extract the maximum possible capacity of the core.

Test instructions:

- Knees should be kept straight and feet on the base of the device.

- The head and core must be straight.
- Each player is given three attempts.
- The cursor must be returned to zero after each attempt.

Register :

- The player scores the best attempt out of the three attempts.

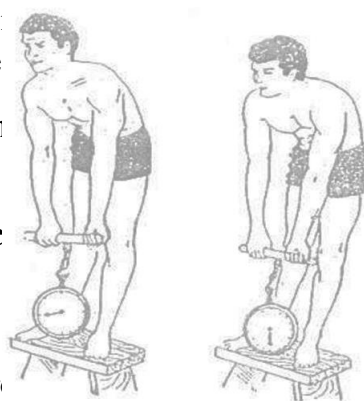
The second test: addresses the first question

What is the effect of core exercises using tools on the muscle power requirement of the core?

Test name: Ball Weighing Test (3 kg)

Objective of the test: To measure the capacity of the core.

Tools used: Dynamometer, flat ground.



Performance specifications:

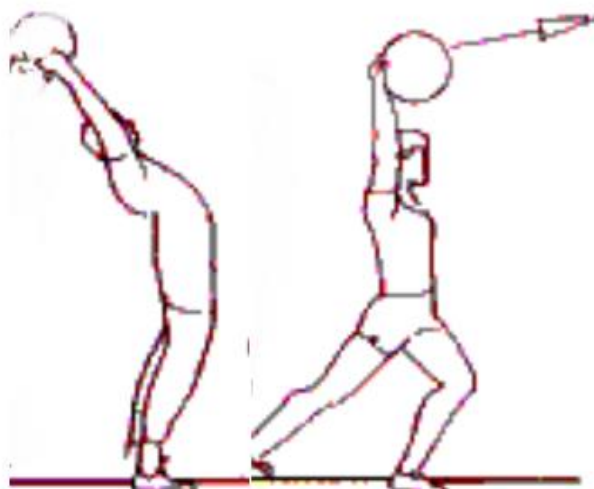
- With the tester standing in a position (standing. forward position. arms high. holding the ball. arching)
- The tester throws the ball forward as far as possible.

Test instructions:

- The throwing motion is by moving the core forward.
- The tester should not bend the arms during the throwing process.
- The tester should not move the feet.
- The tester performs three attempts between each attempt and the other five minutes rest.

Register :

- The player records the best attempt that represents the farthest distance of the three attempts.



The third test: addresses the second question

What is the effect of upper limb exercises on upper limb muscular power requirement?

Test name: throwing a medical ball weighing (3 kg) to the farthest distance from high sitting.

The purpose of the test: to measure the ability of the muscles of the arms.

Tools used: medical ball (3 kg), chair, tape measure, flat ground, chalk.

Performance specifications:

- The tester sits on a chair with a backrest.

- The core is fixed with a strip of fabric to the seat backrest.

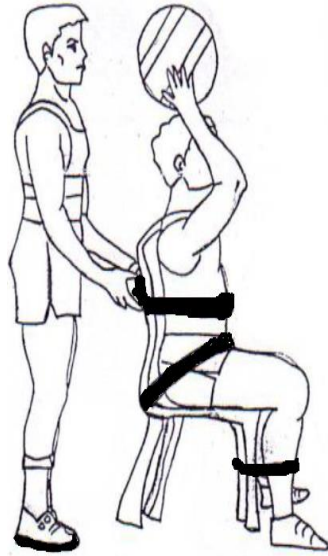
- The tester throws the ball forward as far as possible.

Test instructions:

- The throwing movement is by moving the arms only.
- The tester performs three attempts between each attempt and the other five minutes rest.

Register:

- The player records the best attempt that represents the farthest distance of the three attempts.



The fourth test: addresses the second question

What is the effect of upper limb exercises on upper limb muscular power requirement?

Test name: throwing a medical ball weighing (1 kg) with one arm to the farthest distance from high sitting.

Test objective: to measure the ability of the characteristic arm muscles.

Tools used: medical ball (1 kg), chair, tape measure, flat ground, chalk.

Performance specifications:

- The tester sits on a chair holding a ball in one arm.
- The core is fixed with a strip of fabric to the seat backrest.
- The tester throws the ball forward as far as possible.

Test instructions:

- The throwing motion is by moving the arm only.

- The tester performs three attempts between each attempt and the other five minutes' rest.

Register:

- The player records the best attempt that represents the farthest distance of the three attempts.

The fifth test: addresses the third question

What is the effect of upper extremity exercises on the level of achievement of the serve from above?

Test name: Top-Facing Transmission Accuracy.

Test objective: to measure transmission accuracy.

Tools used: (10) volleyballs, volleyball court.

Performance specifications:

- The tester stands in the middle of the service area, holding the ball.
- The tester sends a transmission from above towards the required area.

Test instructions:

- The tester must serve correctly.
- The transmission must be performed from stability.

Register:

- The tester gets three points if the ball falls in the required area.
- The tester gets two points if the ball lands in the vicinity of the required area.
- The tester gets one point if the ball falls in the area far from the required area.
- The tester gets a zero if the transmission is wrong.