

Effect of Exercises Using Rubber Ropes to Develop the Explosive Power of the Upper and Lower Extremities and the Accuracy of Spiking Skill of Volleyball

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Abstract

The study aimed to prepare exercises using rubber ropes to develop the explosive power of the arms and legs and the spiking accuracy of volleyball players, and to know the effect of the training curriculum prepared in developing the research variables, while the research hypotheses were that there is a positive effect of rubber rope exercises in the development of the explosive power of the arms and legs and the accuracy of the spiking of volleyball, the community and the research sample were chosen by the deliberate method, which consisted of the players of the College of Physical Education and Sports Sciences / Anbar University team for the 2019/2020 academic year, whose number was (14) players. The Libero players were excluded for not participating in the attack process, so that (12) players remain representing Research sample, in addition to statistical means, the results of the research were also presented and discussed, through which it was reached to achieve the objectives and hypotheses of the research, and the researchers reached a set of conclusions and recommendations, including that there is a statistical indication in the results of the research in all study variables and for the benefit of post-tests, and exercises for the use of rubber ropes had a positive effect on developing the explosive power of the upper and lower extremities and the precision of volleyball striking skill. The researchers recommend the necessity to implement exercises for the use of rubber ropes to develop some of the physical and skill abilities of volleyball players, and the need for coaches to pay attention to developing the explosive ability of the upper and lower extremities because of their essential role in developing the level of skillful performance of volleyball players. The performance of exercises for the use of training auxiliary tools had a positive effect in developing the accuracy of the skill of spiking volleyball, and the researchers recommended the use of special exercises and circulating them to trainers working in this field to benefit from them, and the need to use training tools to assist in developing the accuracy of the spiking skill of volleyball .

Introduction:

The training process has witnessed a remarkable development in its methods in order to reach a high level in sports achievement and in most sporting events, as physical fitness in its general concept expresses the athlete's pursuit of upgrading the level, so modern training

methods have taken a distinct character in order to develop physical and skill abilities and optimal use. For time and effort regarding this development, among the important physical abilities that witnessed this development are the explosive power, which is one of the necessary capabilities for many sporting events in general, and volleyball and the crushing skill in particular, as we find that this activity depends on the characteristic of force in general and explosive force in particular, and is the process of developing and developing strength. Explosion through the use of different methods, such as the method of training using rubber ropes in performing exercises, one of the important things that develop special characteristics and their reflection in the level of physical abilities, as this method has become one of the scientific methods for all levels and for a large number of sporting events in which explosive force is a major factor. These exercises are represented by (the use of rubber ropes in the foot jump, the two-foot jump, the deep jump, the horizontal swing, the vertical swing, and throwing exercises using medical balls) and many exercises that have an effective effect in sporting events.

The nature of the researchers' work is represented by using rubber ropes in performing exercises to develop the explosive power of the arms and legs for the team of the College of Physical Education and Sports Sciences in volleyball, as the nature of these exercises will lead to improvement in the physical and skill aspects and therefore the result of using rubber ropes in these exercises is an attempt developing the aspect of skill performance in the accuracy of the striking, diagonal and straight hitting volleyball.

Research problem :

The researchers found, through their observation of the performance of the college team, that there is a decline in the player's performance of the skill of hitting the crushing ball with volleyball, and the reason for this is the neglect of exercises that develop physical and skill traits, as it is necessary to choose effective and effective training methods in developing this skill by developing explosive force For the upper and lower limbs that contribute a large part to the success of the skill's performance, which prompted researchers to delve into this study and try to find scientific means to address this problem, by using rubber ropes in training units in order to develop the physical and skill spiking of volleyball players.

Research objective:

- Preparing exercises using rubber ropes to develop the explosive power of the arms and legs and the accuracy of spiking volleyball.
- Knowing the effect of the prepared training method on developing the explosive power of the arms and legs and the spiking accuracy of volleyball.

Research hypotheses:

- Rubber rope exercises have a positive effect on developing the explosive power of the arms and legs and the accuracy of spiking volleyball.

- There is a positive contribution to the exercises of rubber ropes on the curriculum prepared in the development of explosive power and the accuracy of spiking volleyball in the research sample.

Research fields:

The human field: Team players of the College of Physical Education and Sports Sciences - Anbar University.

Time field: from 4/10/2020 to 2/12/2020.

Spatial field: The closed hall in the College of Physical Education and Sports Sciences - Anbar University.

Research methodology and field procedures:

Research Methodology:

The study of the nature of the phenomenon that the researchers touched upon is what determines the nature of the curriculum because the curriculum is "a method by which a person reaches a truth" ⁽¹⁾.

Community and sample research:

The research community and sample were selected by the deliberate method, which consisted of the players of the College of Physical Education and Sports Sciences / Anbar University team for the academic year 2019/2020, and their number was (14) players. The Libero players were excluded for not participating in the attack process, so that (12) players remain as the research sample and that was their percentage (85.71%) from the research community.

Devices, tools and methods used in the research:

Methods of data collection:

- The observation.
- The interview.
- Sources and references.
- Tests and measures.

Research tools and devices used

- Tests and measurements.
- Observation and experimentation.
- Arab and foreign sources.

As for the devices that the researchers used, they are as follows:

- Rubber ropes, rubber balls, different height wooden boxes, a tape measure, medical scale, auxiliary staff, flying balls, medicine balls of different weights.

The tests used in the study:

Vertical jump test from stator: ⁽²⁾

The aim of the test: to measure the explosive force of the leg muscles.

Tools and supplies: a smooth wall not less than (3.60) m high from the ground, a wood panel dyed black with white lines drawn between each line (2 cm), magnesium powder, a cloth to wipe the powder marks after reading each laboratory attempt, Draw a line perpendicular to the wall in length (30 cm).

Performance description: The tester dips the fingers of his distinguished hand with the powder, then stands facing the board, extends the arms as high as possible, and marks with the powder on the board when the heels touch the ground, as shown in figure (1).

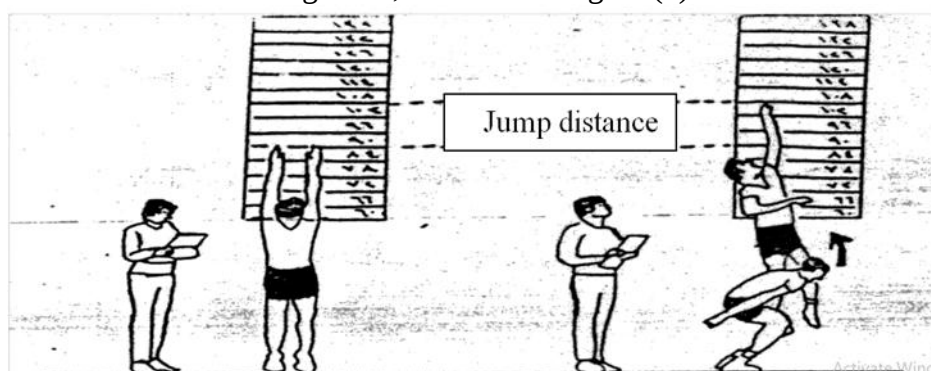


Figure 1

The vertical jump test demonstrates stability to measure the explosive force of the leg muscles

- After that, the laboratory turns to stand next to the board, so that the feet are on the 30 cm line.
- The laboratory swings the arms down and back with the torso bending forward and down and the knees bent to a right angle position only.
- The laboratory extends the knees and raises the feet together to jump up with the arms swinging strongly forward upward and bring them to the highest possible height so that the powder mark is at the highest point it reaches.
- The laboratory is given three attempts and the best attempt is calculated for him with a slight rest period between one attempt and another.
- Jumping up from a standing position and not by taking a step or rising.
- It is preferable for the judge to stand on a table near the laboratory so that he can read the results.

Laboratory management.

- A recorder that calls the names and records the results.
- An umpire who calculates grades and notes performance.

Calculation of grades.

- The laboratory score is the number of centimeters between the line that it reaches from the standing position with the arms up and the mark that marks it as a result of the jump up, rounded to the nearest centimeter.

Throwing a medicine ball weighing (2 kg) with both hands over the head from a standing position⁽³⁾.

The aim of the test: to measure the explosive force of the muscles of the arms and shoulders.

Tools and supplies: A medical ball weighing (2) kg, a measuring tape.

Description of performance.

- The laboratory stands behind a line and the medical ball is carried by hands over the head. The laboratory tries to throw the ball as far as possible without taking any step forward.
- Each laboratory has three attempts to score the best of them.

Scoring method: The distance between the front edge of the feet (behind the line) and the closest point the ball places on the ground is calculated.

Spiking test:**Measuring the accuracy of the overwhelming multiplication in the diagonal and straight direction⁽⁴⁾:**

The purpose of the test: to measure the accuracy of the spike in the diagonal and straight direction.

Tools: 30 volleyballs, a legal volleyball court, two arrangements placed at point No. (5), (1) measuring (1 x 2) m placed at the corner of the field so that their inner corners are at a distance (5 cm) from the side line, the end and the shaded area is 3m x 3m.

Performance specifications: Spiking from center No. (4) so that the coach passes (pass) to him from position No. 3 using the long diagonal pass. The laboratory must perform (15) an attempt by crushing towards the diagonal direction (the rank in point No. 5) and (15) an attempt by crushing in the straight direction (the position in the center No. (1)).

Registration:

- 4 points for every correct spike in which the ball falls on the rank.
- 3 points for every correct spike in which the ball falls into the planned area.
- 2 points for every valid spike in which the ball is dropped in area (A) or (B).
- (1) point for every crushing hit across the field.
- Zero for every failed ace.

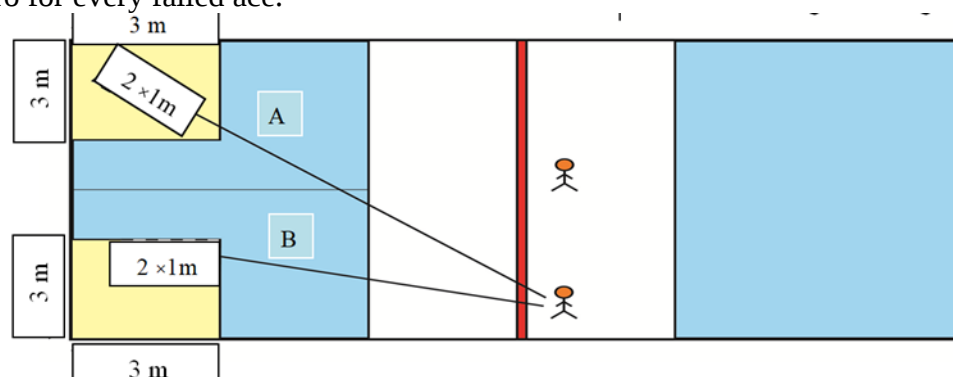


Figure (2)

It demonstrates how to perform the accuracy test of diagonal and straight crushes

Exploratory experience.

The researchers conducted the exploratory experiment on Sunday 4/10/2020 on a group of (6) players from the main research sample, as this experiment aimed to identify the obstacles that may accompany conducting the tests and work to avoid them, if any, in addition to knowledge. Sufficient number of assistive work team members to implement field research procedures.

Pre-test:

The pre-tests were conducted for the research sample on Tuesday and Wednesday 6-7 / 10/2020 in the closed hall of the College of Physical Education and Sports Sciences - Anbar University. On the first day the physical tests were conducted, but on the second day the skill test was taken and the researchers took care as much as possible, control the conditions related to the tests (location, tools, supplies, method of implementation, support staff) for their availability in the final (post) test.

Main experience:

Through the curriculum prepared by the researchers, exercises were developed using rubber ropes to develop the explosive power of the muscles of the arms and legs and its positive effect with precision the skill of crushing volleyball, as the researchers find that the training method used here meets the requirements of upgrading the physical and technical aspects together of the players of the research sample.

- This approach was applied for the period from 10/11/2020 until 12/6/2020 at a rate of (3) units per week for a period of (8) weeks, as the total number of training units reached (24) training units, as it was applied to the players of the research sample.
- The players implemented prepared exercises using rubber bands.
- Medical balls of different weights (2 kg, 2.5 kg) were used. They represent exercises to develop explosive strength in the arms in addition to being exercises practiced using rubber ropes.
- The researchers used exercises related to the skill of spiking with volleyball, such as jumping and spiking in a series.
- The researchers took into account the gradient and wave of intensity when preparing the exercises, as its ratio in weeks was (3: 1), that is, three units of high intensity, then one unit with low intensity.

Post-test:

The researchers conducted the post-test for the research sample on Tuesday and Wednesday, corresponding to 1 and 2/12/2020, in the same manner as the pre-tests, and the researchers were keen to create the same conditions and requirements for all the previous tests.

Statistical means: The researchers used the Statistical Package (SPSS).

Presentation, analysis and discussion of test results:**Presentation, analysis and discussion of the results of the explosive strength tests and the accuracy of the spiking skill:**

Table (1) shows the arithmetic mean, standard deviations, and differences for the pre and post-tests:

Variables		measuring unit	Pre-test		Post-test		Difference of means	Difference Standard	T value	Sig type
			Mean	Std. Deviations	Mean	Std. Deviations				
The explosive force of the upper extremities		Cm / M	6.316	2.313	6.7	2.44	0.366	0.228	5.630	Sig
The explosive force of the lower extremities		Cm / M	48.416	17.964	50.083	18.602	1.666	1.452	3.976	Sig
spiking Accuracy	diagonal	Degree	36.416	13.812	38.583	14.499	2.166	2.143	3.504	Sig
	straight	Degree	36.5	13.969	39	14.742	2.5	1.791	4.835	sig

The number of players (12) the degree of freedom = 12 - 1 = 11 and below the significance level (0.05) and the (T) tabular value = (2.201).

Table (1) shows the results of the explosive force of the upper sides, as it becomes clear that the value of the means of the differences was (0.366), with a standard deviation of (0.228), and the calculated value of (T) appeared (5.630), greater than the tabular value of (T). There are statistically significant differences in favor of the post-tests.

As for the results of the explosive force of the lower extremities, as it becomes clear that the value of the arithmetic means of the differences was (1.666), with a standard deviation of (1.452), and the value of (T) computed appeared (3.976), greater than the tabular value of (T), and this indicated the existence of statistically significant differences In favor of post- tests.

As for the accuracy of the diagonal overwhelming skill, as it turns out that the value of the arithmetic means of the differences was (2.166), with a standard deviation of (2.143), and the calculated value of (T) appeared (3.504), greater than the tabular value of (T), and this indicated the existence of statistically significant differences in favor of Dimensional tests. As for the precision variable of the straight spiking skill, as it turns out that the value of the arithmetic means of the differences was (2.5), with a standard deviation of (1.791) and the value of (T) computed appeared (4.835), greater than the tabular value of (T), and this indicated the existence of significant differences Statistically in favor of the post- tests

Discussing the results of the lower limb explosive force test:

We find that these presented results indicate the differences that appeared between the two arithmetic means and a clear indication of the preference for the results of the post-tests of the research sample players, which indicated the effect of the training curriculum prepared by the researchers, which included exercises using rubber ropes, which contributed to the development of the study variables, accordingly, the researchers believe that the adoption of exercises with rubber ropes in the training units, which also included exercises with the medical ball with different weights and positions, led to the development of the explosive force of the arms, and this is consistent with what was mentioned by (Fayez Abu Arida, 1999) in a study he conducted and concluded through it that the pliometric training contributes to the development of explosive force of arms shown in throwing movements, In addition, the use of this group of medical ball exercises led to mastering the technique of throwing as a result of repetition, which contributed to improving the test result ⁽⁵⁾, and the results of this research support the findings of previous research in the field of developing the explosive force of the arms in the medical ball throwing test using rope exercises inflatables.

The researchers attribute the reason for the moral differences and the development in the level of the players 'performance with the research variables to the effect brought about by exercise using medical balls, ropes and rubber balls, and we find that the medical ball test from standing despite it depends on the movement of the arms and shoulders only, (Radcliff) confirmed that these exercises and tests related to rubber rope exercises from throwing, jumping and rolling had a significant positive effect on the outcome of the post-tests, and thus this led to the development of the explosive strength of the arms, in addition to the use of medical balls in different positions that enhanced the muscular endurance of the players Which worked to

develop the physical competence of the process of stretching and shortening the muscle during the extension phase of decentralization of muscle contraction, thus, a greater amount of elastic energy is stored inside the muscle, and this stored elastic energy is reused in the central inotropic phase and thus led to an increase in working muscle strength, as the idea here focuses on the time it takes to move from a state of lengthening to a state of shortening and the results of the study resulted in the presence of an effect Positive for the development of explosive force of the arms using medicinal balls) ⁽⁶⁾.

Also, the use of the research sample for rubber rope exercises led to mastering the technique of throwing as a result of repetition, which contributed to improving the achievement result, and the gradual increase in the weights of medical balls in the training units is in order to obtain muscular adaptation, which makes the muscle more able to cope with the change in the amounts of weights. As training without gaining weight will not help in improving and developing the muscle strength of the muscles involved in performance, especially if the training sample is not used to training with weight gain, as we find that the greater the strength of the arm muscles, the player can control the movements performed in the skill of crushing, as for the variable of the explosive force of the lower extremities, the reason for this development is attributed to the exercises prepared by researchers, which greatly contributed to the development of the explosive force of the muscles of the legs, provided that it was prepared according to a solid and organized scientific basis, as we find that exercises using rubber ropes in the training process was It has an influential and effective role in developing the muscular strength of the lower extremities by coordinating and organizing the muscular work between the contraction of the working muscles and their relaxation, which helped in the players' performance of movement easily and in an orderly manner, "As there is a correlation relationship when increasing the strength of the leg muscles with the results of the explosive force expressed by vertical jumping"⁽⁷⁾. The researchers believe that stomach exercises using rubber ropes had a positive effect on developing the muscle strength of the two legs, which included the participation of the largest number of muscle fibers when the players implemented the vertical jump test from the movement in the post tests, and as a result this led to the adaptation of the body's organs to the optimal performance of these exercises, in addition to the linkage of the training process with other sciences, which strengthened the players' self-confidence when performing all skills and increased their motivation to train and make effort the multiplier to get to the best levels, this contributed to the development of the technical aspect related to the kinematic performance by improving the kinematic speed of the approach steps and the rise time and strength, as the development in the kinematic speed of the approach steps and increasing their range leads to the kinematic transmission from the lower extremities to the rest of the body and thus increase the rate of rise where this aspect is important In the performance of the skill of spiking, where this stage creates a kind of difficulty for the player that he may be able to overcome through the correct timing of the process of standing up and jumping, which depends on the speed and power gained from the explosive power of the two leg muscles of volleyball players.

As for the diagonal and straight hitting skill, the researchers see that the player's mastery of the skill of spiking will lead to the success of playing and achieving victory, especially in the offensive process of any team, due to the increase in the muscular section of the lower extremities due to the use of rubber ropes in the training process, as well as the participation of the largest number of muscle fibers when the player performs the motor duty, and this comes through the high muscular capacity of the two legs while the player performs the skill of spiking, and he mentions (Siddiq Tulan, 1980) "The vertical jump is improved by developing the explosive force of the muscles of the legs and increasing the vertical jump distance, in addition to the ability of the arm muscles while performing the skill spiking" ⁽⁸⁾.

The researchers attribute that development to the improvement of the most important requirements for the performance of the crushing skill represented by the explosive power of the arms and legs, whether from jumping or when performing the spiking, in addition to achieving real balance and correct timing during the hitting process, and therefore the ability to land correctly to avoid any error. When jumping again or when performing a second skill, and this indicates that there is a close connection between the development of special abilities and the success in the performance of the motor skill, which was reflected in the improvement of the results of this test, we also find that the increase in the accuracy of the spiking that appeared in the post test did not come by chance, but to the positive use of rubber ropes and their effect on increasing the explosive force of the leg muscles, which led to the player jumping high, and leading to his control over the direction of spiking the ball, thus increasing the accuracy of directing the ball in the desired place, and stresses (Chu and 1995) that "a great compatibility, balance and control over the body through the use of rubber rope exercises" ⁽⁹⁾.

The researchers believe the reason for this development is due to the nature of what is contained in the special exercises prepared by them, which contained load components commensurate with the players' levels and abilities, and it includes special exercises in which rubber ropes and medical balls were used, as well as the use of body weight and other auxiliary tools, that the diversity in the use of different exercises to develop the strength of the muscles of the same muscle group leads to a significant increase in the force or the characteristic of explosive force, and that the use of medical balls had a great impact in developing the explosive force of the two arms, which reflected positively on the development of the performance of the skill of spiking the volleyball, the use of rubber ropes when carrying out the exercises contributed to the development of physical abilities, which included jumping exercises and their suitability when performing the skill of spiking from the front area, which helped the player generate additional force for the working muscles to accelerate the movement of the striking arm, allowing the player to hit the ball with a full extension of the arm and from top corner and facing appropriate.

Conclusions and recommendations:

Conclusions:

- There is a statistical indication in the results of the research in all the variables of the study and in favor of the post-tests.
- The exercises for the use of rubber ropes had a positive effect in developing the explosive power of the upper and lower extremities and the accuracy of the spiking skill with the volleyball.

Recommendations:

- The necessity to carry out exercises for the use of rubber ropes in developing some of the physical and skillful abilities of volleyball players.
- The need for coaches to focus on developing the explosive ability of the upper and lower extremities because of their essential role in developing the level of skillful performance of volleyball players.

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