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Zainab Saleh Kadhim

Assistant Lecturer, Altoosi

University College, Najaf, Iraq

Ayat abbas Alwan

Assistant Lecturer, College of
Physical Education and Sports
Sciences, University of Kerbala,
Iraq

Athraa Sadiq Silh

Assistant Lecturer, College of
Physical Education and Sports
Sciences, University of Kerbala,
Iraq

Corresponding Author:

Zainab Saleh Kadhim

Assistant Lecturer, Altoosi

University College, Najaf, Iraq

The effect of special exercises for the leg muscles and the achievement of the long jump under 18 years of age

Zainab Saleh Kadhim, Ayat Abbas Alwan and Athraa Sadiq Silh

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Abstract

There are different and important training methods at the present time that serve the game or sporting event, as well as its exercises, and among them are special exercises used to develop the leg muscles of the long jump player in the age group that is under 18 years. A problem has been resolved and sufficient information has been given to coaches of these ages within the long jump is dedicated to advancing achievement and reaching a good achievement worthy of the reputation of our beloved Iraq in international forums.

The goal of the research was to develop targeted leg muscle workouts and long jump accomplishment for individuals under the age of eighteen. The study also sought to determine how certain workouts affected under-18-year-olds' ability to perform large jumps. The pre- and post-test results were thought to differ significantly, favoring the post-tests that had an impact, according to the researchers. Unique workouts for the performance and muscles of the legs. The post-test results showed a substantial difference between the experimental and control groups, with the experimental group performing better on the research variable. The experimental approach, or equal groups technique, was selected by the researchers because it is the most suitable strategy for resolving the study problem and achieving the objectives. Participants in the long and adult jump contests who were under the age of eighteen made up the research sample. There are ten players total; the research sample consisted of eight players who were randomly assigned to the control and experimental groups, with four players in each group. Utilizing the coefficient of variance in the research variables, each group was homogenized independently. The program's exercises were still being applied after they were completed during the special preparation phase. A 10-week term of training. The exercises were performed between 80% and 100% of one's potential. The researchers made sure that every member of the research sample received the same level of training on the remaining days of the week.

Keywords: Special exercises, achievement, long jump

1. Introduction

The development taking place in life in general and sports in particular came as a result of research, experiments and various sciences to serve the sports community, and one of these sciences is the science of sports training, which is a purposeful educational process with scientific planning to prepare players at various levels and according to their ability, buds to the advanced category, multi-faceted preparation. The diversity of training methods and methods used in sports training has a clear impact in raising the level of achievement of the athlete.

Therefore, it is crucial to conduct research to create customized workouts that aim to improve physical attributes and skill levels, as well as to determine the degree to which these exercises contribute to the development of these attributes and skills. Additionally, it is important to work toward equipping coaches and players with the knowledge they need to help them develop these skills and abilities and to use that knowledge in their hands to reach the competition's high standards.

1.2 Research problem

There are multiple methods for training the muscular strength of the legs, and each method

aims to serve the practice competition, as is the case with performing the exercise that aims to develop and improve the muscular strength and explosive ability of the athlete in the long jump competition. Therefore, among the most important weight training exercises used to develop the athletes' leg muscles is Jumping and plyometric exercises, some trainers use this exercise with weights once from stability, that is, bending the legs with the feet firmly on the ground, whether that is in a half-dibni (half-bend) or a quarter-dabni (quarter-bend), and at other times they use jumping with weights in order to make adaptations to develop the muscles of the legs. Reaching the results of this study provides scientific information for coaches about the development strategies for both methods in developing the muscular strength and explosive ability of the legs for long jump players under 18 years of age. Therefore, the researchers turned to studying this problem to find out the effect of these special exercises for developing the leg muscles and achievement to provide information for coaches and players.

1.3 Research objectives

1. Preparing special exercises for the leg muscles and performing the long jump under 18 years.
2. Determine how certain workouts affect the development of long jump accomplishment in individuals under the age of eighteen.

1.4 Research hypotheses

1. Because of the impact of targeted leg muscle workouts and accomplishment, there are notable variations between the pre- and post-tests, with the post-tests showing a

considerable increase.

2. The post-tests show a substantial difference between the experimental and control groups, with the experimental group performing better on the research variable.

1.5 Research fields

1.5.1 Human field: Under-18 national team players.

1.5.2 Time field: From 1-9-2023 to 25-12-2023.

1.5.3 Spatial field: College of Physical Education and Sports Sciences Stadium - University of Baghdad, Ministry of Youth and Sports Stadium - Baghdad.

2. Research methodology and field procedures

2.1 Research Methodology

The experimental technique (equal groups method) was selected by the researchers because it is the most suitable approach for resolving the research problem and achieving the study's goals.

2.2 Research sample

Ten athletes under the age of eighteen who competed for their country in the long jump were picked by the researchers as the research sample. Eight players made up the research sample, which was randomly split into two groups: experimental and control. There were four players in each group, and each group was homogenized independently. Making use of the study variables' coefficient of variation, as indicated in Table (1).

Table 1: Shows the homogeneity of the control and experimental groups in the research variables.

Variables	Measuring unit	Experimental			Control			T Calculated	Sig level
		Mean	Std. Deviation	Difference Coefficient	Mean	Std. Deviation	Difference Coefficient		
Training age	Year	5.8	1.35	1.65	5.4	1.35	1.75	0.523	0.65
Mass	Kg	68.2	3.25	10.80	65.56	3.21	10.30	1.30	0.25
Length	Cm	170.1	4.50	20.05	167.5	3.60	12.60	0.99	0.335

Table 2: Research design utilizing an experimental approach.

Groups	Pre-test	Experimental dealing	Post-test
Experimental	Weight exercises and plyometrics	Exercises used in the research	Weight exercises and plyometrics
Control		Trainer exercises	

2.3 Field research procedures

2.3.1 Determine tests for special variables in the research

After reviewing a large number of scholarly publications on the subject, the researchers decided to conduct the following experiments:

1. Testing the maximum strength of the legs
2. Modified Sargent's test
3. Long jump completion test

2.4 Tests used in the research

2.4.1 Testing the maximum strength of the legs (squat)

For both legs - Squat - it is performed once with maximum load.

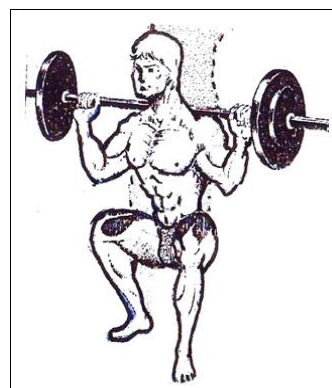


Fig 1: Testing the maximum strength of the legs (squat)

2.4.2 Vertical jump test from a standstill (modified Sargent's test): (Hassanein, Muhammad Sobhi, 1987) [1].

2.4.3 The purpose of the test: To gauge the legs' substantial muscles' capacity for explosion. The athlete is measured while standing, with the measuring tape fully stretched, and the belt

fastened around his waist so that the metal piece is between his feet. It is determined and noted what the apparent reading from the tape is in front of the metal piece's hole. The tester jumps as far vertically as possible from this position. The tape will move, he says. The player's leap will cause it to rise to its maximum height, at which point it will be fixed and the new reading on the tape in front of the metal piece's hole will be recorded.

2.4.4 Directions

1. Draw a circle on the ground with a diameter of (50 cm) and jump inside it.
2. The attempt will be canceled if the tester lands after jumping outside the circle drawn on the ground.
3. The tester has two attempts, the best of which is recorded.

2.4.5 Register: The first reading and the second reading are recorded, and the difference between the two readings expresses the explosive capacity of the laboratory

2.5 Long jump completion test

Objective of the test: to gauge one's success in long jumping.

Description of the performance: After positioning his approach mark on the approach route, the athlete tries the leap and completes the jump (raising, soaring, and landing). The last trace the competitor left behind during the long jump is used to compute the attempt. After three tries, each participant selects the ideal distance. He makes three tries.

2.6 Exploratory experience

In order to determine potential roadblocks in the field experiment procedures, the researchers performed a reconnaissance experiment on two players from the national long jump team who are under eighteen years of age on 5/9/2023, a Tuesday, at precisely four o'clock in the afternoon, at the University of Baghdad stadium.

2.7 Scientific foundations of tests: As a result, tests and

standards are a crucial component of assessment and are applied to all data in the process. Additionally, tests and instruments are good because they meet the requirements of scientific transactions, which are validity, reliability, and objectivity.

2.7.1 Validity of the test: (Ibrahim, Marwan Abdel Majeed, 1999, p.90) ^[2].

The validity coefficient may be found in a variety of methods, and the researcher employed content validity to ascertain its validity by choosing it from scholarly sources pertinent to the study's subject.

2.7.2 Test reliability

The researchers used the (test and retest) method to find the test reliability coefficient, so they applied the tests on 7/9/2023, and the same tests were repeated. The test is stable if it yields the same results when it is repeated for the same sample members on two different days (Ibrahim, Marwan Abdel Majeed, 1999, p.90) ^[2]. The researchers extracted the reliability coefficient by applying the simple correlation coefficient (Pearson) between the first and second tests of the tests, using the same conditions as the exploratory experiment and on the same sample members on Monday, 11/9/2023, that is, four days apart from the first test. All correlation coefficient values were as seen in Table (3), the simplex generated for each test has a value of 0.811, which is larger than the tabular value at degree of freedom (4) and demonstrates that each test has a high reliability coefficient.

2.7.3 Objectivity

The test's objectivity is defined as its ability to remain unaffected by the replacement of arbitrators or to produce consistent results regardless of the person administering the arbitration. In other words, it is free from fanaticism or bias and does not introduce the tester's or arbitrator's personal characteristics, such as opinions, whims, or inclinations. Being objective implies that a person's talents are just half of what they could be. Definitely not what we had hoped for.

Table 3: Displays the tests under study's objectivity and reliability coefficients.

Tests	Reliability coefficient	Sig type	Objectivity coefficient	Sig type
First Test	0.869	Sig	0.897	Sig
Second Test	0.881	Sig	0.898	Sig
Third Test	0.882	Sig	0.896	Sig

2.8 Pretests

On Thursday, 14/9/2023, at precisely four o'clock in the afternoon, at the Ministry of Youth and Sports stadium in Baghdad, the researchers conducted tribal measurements tests on the eight players that made up the research sample. Prior to this, measurements of the players' height, weight, and training age were recorded for their relationship to physical variables and achievement, in order to calculate the test score, determine the players' level, and base their work accordingly.

2.9 Main experiment

To construct the research variable, the researchers had jumpers complete workouts. In addition to the researchers' limited expertise obtained from rehearsing for the tournament and their research background, they will incorporate strength and plyometric workouts, drawing on scientific sources for support. What set the workouts apart were the following:-

1. The activities were completed during the unique preparatory phase.

2. On Sunday, 16/9/2023, the workouts started.
3. The training program's activities were carried out for a duration of ten weeks.
4. The quantity of training units-two-per week.
5. The total quantity of training units is twenty.
6. The duration of the workout varied, ranging from 27 to 35 minutes.
7. Taking into account the results of the pre-tests given to the study sample, the exercise intensity was set between 80% and 100% of the athlete's maximal capacity.
8. The researcher employed repeated training (80% - 100%) and high-intensity interval training as training techniques.
9. There was a 2-to 3-minute rest interval between workouts and a 5-to 6-minute rest interval between repeats.
10. Although the training amount was dispersed in two distinct ways, it was the same for both experimental groups.
11. The researchers considered that, with regard to training load components, physical attributes, and skills, training

on the remaining days of the week should be as equitable as feasible for every member of the research sample.

12. Both groups were subjected to the training program's planned activities simultaneously.
13. On Monday, 11/12/ 2023, the planned drills came to a conclusion.

2.10 Posttests

On Wednesday, 13/12/2023, at precisely 4:00 p.m., the researchers performed post-measurements on the research sample participants in the stadium of the University of Baghdad's College of Physical Education and Sports Sciences. They ensured that the same spatial and temporal conditions and procedures were used for the pre-

measurements. To the greatest extent feasible.

2.11 Statistical methods

The researcher used the statistical package (SPSS) to find:

1. Arithmetic mean.
2. The mediator
3. Standard deviation.
4. Coefficient of difference.

3. Results presentation, analysis, and discussion

3.1 presenting, evaluating, and debating the findings from the experimental and control groups' pre- and post-tests on the variables under investigation.

Table 4: Shows the values of the arithmetic means, standard deviations, and the calculated (t) value for the control and experimental groups for the variables under study.

Groups	Tests	Mean	Std. Deviation	T Value	Sig type
Maximum speed of both legs	Pre	5.122	0.0753	6.33	Sig
	Post	4.976	0.08234		
Vertical jump for both legs	Pre	26.4	1.6733	-6.5	Sig
	Post	29	1.2247		
Maximum strength of the legs (squat)	Pre	79.5	4.4721	24	Sig
	Post	86	2.8504		

Highlighting the information in Table (4) made it evident that the arithmetic means and standard deviations for the tests under investigation in the post-test differed from those in the pre-test. In the pre-test, the control group obtained an arithmetic mean of 5.122 seconds with a standard deviation of 0.0753, while the arithmetic mean of the two dimensions was (4.986) with a standard deviation of 0.08234. The researchers utilized the (T) test for symmetrical samples to show how workouts affected the back of the legs since the computed (T) value was (6.33), which is higher than the tabulated value of (2.132) at a degree of freedom. With a significance threshold of 0.05 and a difference between the pre- and post-test results of (4), it can be concluded that there is a substantial influence of the double leg workouts on the legs' ability to achieve maximal speed. Regarding the leg vertical jump test, the group's pre-test result was an arithmetic mean of (26.4) cm with a standard deviation of (1.6733). In contrast, the two dimensions' arithmetic mean was (29) with a standard deviation of 1.224. The researchers employed the (T) test for symmetrical samples to show the impact of heavy weight workouts. The computed (T) value was (6.5), which is higher than the tabular value (2.132), at a degree of freedom (4) and a significance level (0.05). This suggests that the results differ significantly from one another. The pre- and post-test results support the post-test, indicating that workouts using both legs have an impact on the improvement of the vertical leap from a standstill. This group's "arithmetical" mean in the pre-test for the two-leg maximal strength test was 79.5 kg, with a standard deviation of (4.4721). The researchers used the (T) test for symmetrical samples to show the impact of exercises with heavy weight because the calculated (T) value was (24), which is greater than the tabulated value of (2.132) at a degree of freedom (4). The arithmetic mean for the two dimensions was (81.9) with a standard deviation of (4.4637). (0.05) is the significance threshold. This suggests that the results of the pre- and post-tests change significantly, favoring the post-test and suggesting the role of bilateral leg workouts in the development of maximal strength.

4. Discussing

As confirmed by Qasim Hassan and Abd Ali Nassif, "to ensure lasting progress," organized, regular, and continuous training based on scientific foundations and consistent with the characteristics and duties of the training had a significant impact on the aforementioned development. The researchers also attribute the reason for the differences between the pre- and post-tests to the exercises used and the nature of the training load. Athletes must plan ahead and use effective strategies in order to achieve optimal performance at higher levels (Hussein, Qasim Hassan & Nassif, Abd Ali,1980, p. 309) ^[3-4]. Additionally, weight training is a highly effective strategy that ensures increase in strength. (Hussein, Qasim Hassan, 1980, p.172) ^[3-4].

The proposed exercises, which confirmed that the use of exercises that had a significant impact on the speed of the legs during performance, and this requires greater effort to move the body, and this effort means an increase in the ability of the athlete as he exerts greater force to overcome his body weight, and this means a special development in muscular strength and ability, Talha Hossam El-Din states, "The training load is an essential means of influencing the functional levels of the body's systems to achieve progress through training, meaning that training results in an increase in the athlete's performance ability as a result of performing physical exercises for several days, weeks, or months, by adapting the body's systems to the optimal performance of those exercises". (El-Din, Talha Hossam, 1993, p. 374) ^[5].

5. Conclusions and recommendations

5.1 Conclusions

1. The suggested workouts helped long jumpers gain more physical strength, explosive power, and speed.
2. There was also development among members of the control group in the level of muscular strength, explosive ability, and speed
3. The experimental group performed better than the control group on all research variables related to jumpers' development of muscular strength, explosive ability, and speed.

5.2 Recommendations

1. Taking up the workouts advised by experts since they are crucial for raising the muscular strength and explosive power of long jumpers.
2. The necessity of using junior-specific workouts and emphasizing undulation throughout the training load.
3. Prior to beginning to study or develop abilities, there should be an emphasis on increasing one's degree of physical fitness, particularly muscular strength overall.

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