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# **The effect of jumping exercises (horizontal - vertical) on some physical kinematic variables and the achievement of the effectiveness of the long jump**

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**Abstract**---There are specific priorities for each activity in the percentages of interest by the trainer or the percentages of exercises used in them for each stage or section of the movement technique or skill performance of the movement, and among the jumping activities in athletics is the effectiveness of the long jump. The same interconnected technical stages consisting of (approaching run - ascent - flight - landing), so the coach in the long jump event must know the priorities for paying attention to these technical stages and focus on developing them to the best possible level. Therefore, these essential stages must obtain the necessary training to develop the most critical practical ability to achieve in these events. Upgrading the long jump, for example, requires a high ability in the man to launch in the shortest possible time and at a certain angle, which requires the development and improvement of the explosive thrust. We must work to develop and improve the ability of the force distinguished by speed (Power) and strength or explosive power (Explosive Power or Strength).

**Keywords**---jumping exercises (horizontal - vertical), physical kinematic variables, long jump.

**Introduction****Research problem**

By looking at the various training programs of most jump and jump coaches, we noticed most of the muscle strength development exercises depend on weight

machines and different weights to develop the level of achievement, as most of these exercises do not resemble the level of skill performance. Hence, the researchers decided to use the varied jump and different methods in the deep jump (horizontal). Vertical) to develop the athletic ability of the muscles of the legs and its impact on some other physical characteristics affecting the achievement of the long jump, as well as the effect of these exercises on the kinematic variables affecting the skill level of performance such as (horizontal speed - and flight time) when performing the skill as a test to indicate the extent The development of the explosive ability of the two men, as well as the ability of the contestant to employ this effort in improving the level of digital achievement.

### **Research goal**

#### **The researchers aim to identify**

1. The effect of the varied jump in the style of the deep jump on the development of explosive ability and some kinematic variables and achievement in the effectiveness of the long jump

#### **Assuming the search**

#### **The researchers hypothesize**

1. Diversified jumping in the deep jump style positively affects the explosive ability of the muscles of the legs in the long jump.
2. The development of the explosive ability of the legs using the varied jump in the deep jump style positively affects some of the kinematic variables (horizontal speed - flight time - jump distance) for the effectiveness of the long jump and achievement.

### **Practical part**

To suit the research problem, the two researchers used the experimental method with one experimental group, using the pre and post-measurement.

### **Research sample and community**

The researchers chose the research community from the youth clubs of Al-Diwaniyah Governorate, which numbered (8) and Athbeen, and one group for the 2021 / 2022 sports season, and they were homogenized with the variables in Table (1).

Table (1)  
It shows the specifications of the research sample

Basic Variables	Unit of measure	Arithmetic means	Standard deviation	Skew coefficient
Age	to nearest month	18.22	0.54	centimetre
Height	centimeter	172.33	2.83	0.41

Weight	kg	68.10	2.70	0.45
The length of the lower limb	centimeter	106.20	1.47	1.01
Long jump from stability (cm)	centimeter	225.45	10.57	1.05
Vertical jump of stability (cm)	centimeter	48.58	3.71	0.75
A distance of five hollows with the right leg (m)	Meter	11.45	0.39	0.28
A distance of five hollows with the left leg (m)	Meter	11.29	0.71	0.45
Achievement	Meter	5.84	0.23	0.52

### Physical exams

The researchers prepared physical abilities tests based on scientific sources in the field of sports training, tests and measurements; they were as follows:

- Test sprint (30) m maximum speed from starting flying.
- Jump test of stability.
- Test (5) balls with the right leg
- Exam (5) left leg hoops
- Long jump achievement test

### The scientific basis for the tests

#### Validity of tests

The objectivity of these tests was found after they were presented to a group of experts in the field of sports training. These experts agreed that the tests reflect the physical reality to be measured in this research.

#### Test stability

The stability coefficient was found by the method of re-testing as it was applied to a group of (3) players on the date (20/8/2013), and the tests were repeated after (7), as the stability of these tests was found through a correlation relationship between the tests and the results were presented in Table (2).

Table (2)

It shows the degrees of the reliability coefficient and the subjective validity of the tests in the research sample

The name of the test	coefficient	the objectivity
enemy 30 meters	0.88	0.93
Long Jump	0.89	0.94
Test (5) right-legged hoops	0.82	0.90

test (5) left-leg hoops	0.85	0.92
Long jump achievement test	0.87	0.92

### **Objective tests**

The objectivity of these tests was found by using two arbitrators to record the results, and the correlation relationship between their results was found in Table (2).

### **Survey experience**

The pilot experiment was conducted on (20/12/2021) on (3) players for

- The assistant work team knows the nature and time of the tests to accomplish their task.
- Ensure the validity of the camera and determine the appropriate place in the field of jumping for filming.
- Organizing and adjusting imaging and kinematic analysis processes to determine the nature of the movement under study.

### **Field Experience**

#### **Tribal tests**

The tribal tests were conducted on (2- 3/1/ 2021) as follows:

#### **The first day included**

30m running the test from a flying position.

- Left leg five-hole test
- Five hoop test with the right leg

#### **The second day**

Long jump stability test

- Preparing the contestants for photography to extract the variables of the kinematic study and achievement:  
The researchers prepared the contestants for photography and measured the digital level according to the following steps:
  - Sportswear runners bounce back
  - Marking the anatomical points of the body joints in the form of (X) from white plaster (sticky tape).

#### **Photographing attempts**

After applying for the program, the researchers photographed three attempts for each contestant in the tribal measurement and three others in the dimensional measurement. The researcher chose the best attempt for each contestant in the tribal measurement and post-measurement.

### **The following was extracted from the analysis process**

- Flight time.
- The horizontal velocity at the moment of ascent.

### **Training Curriculum**

The duration of the training program is (8) weeks, with (2) training units per week, with a total of (16) training units. The training program aims to develop the explosive ability of the two men by using the varied jump as one of the modern methods used to develop this trait. The exercises are performed at full speed to ensure that endurance does not interfere with athletic ability. -Using an intensity ranging from (60% to 80%) of the rider's maximum ability about the horizontal and vertical distances in those exercises, the number of sets of (2-3) and the number of repetitions of (6-12) repetitions with an active rest period between groups of (2 -3 minutes and between repetitions of (40-90) seconds.

### **The program execution time ranges from 50-60 minutes**

- Taking into account the principle of increasing the intensity, through the maximum height of the wooden box for each contestant, provided that the maximum height does not exceed 100 cm.
- Taking into account the measurement of the appropriate height of the box every two weeks, whether for both men or each leg or each man separately, to determine the appropriate height for each individual for the following two weeks.

### **Post-tests**

The post-tests were conducted over two days on February 8, 2022, with the same procedure and sequence of the tribal tests.

### **Statistical manipulations**

Use the SPSS statistics program

### **Results**

Presentation and discussion of the results of the study variables in the pre and post-tests and the rate of development in the study variables

Table (3)

It shows the arithmetic mean and standard deviation of the study variables in the pre-test

Variables	Arithmetic means	Standard deviation	Skew coefficient
30m sprint time from flying start (s)	3.59	0.38	0.34
Long jump from stability	225.45	10.57	0.05

(cm)			
Vertical jump of stability (cm)	48.58	3.71	0.75
A distance of five hollows with the right leg (m)	11.45	0.39	0.28
A distance of five hollows with the left leg (m)	11.29	0.71	0.45
Flight time (s)	0.56	0.001	0.34
Horizontal velocity at the rising moment (m/s)with the left leg (m)	7.97	0.13	0.87
Digital Level (B)	5.84	0.23	0.52

Table (4)

It shows the arithmetic mean and standard deviation of the study variables in the post-test

Variables	Arithmetic means	Standard deviation	Skew coefficient
30m sprint time from flying start (s)	3.17	0.25	1.25
Long jump from stability (cm)	258.00	4.84	صفر
Vertical jump of stability (cm)	67.25	3.33	0.11
A distance of five hollows with the right leg (m)	12.34	0.20	0.40
A distance of five hollows with the left leg (m)	12.25	0.16	صفر
Flight time (s)	0.70	0.02	0.47
Horizontal velocity at the rising moment (m/s)with the left leg (m)	9.27	0.12	0.45
Digital Level (B)	6.49	0.16	0.64

Table (5)

It shows the significance of the differences between the mean of the pre and post-measurements of the study variables

Variables	Pre-measurement		Post-measurement		value (T)*
	Arithmetic means	Standard deviation	Arithmetic means	Standard deviation	
30m sprint time from flying start (s)	3.59	0.38	3.17	0.25	4.64
Long jump from stability (cm)	225.45	10.57	258.00	4.84	9.43
Vertical jump of stability (cm)	48.58	3.71	67.25	3.33	5.62
A distance of five hollows with the	11.45	0.39	12.24	0.20	12.47

right leg (m)					
A distance of five hollows with the left leg (m)	11.29	0.71	12.35	0.16	18.90
Flight time (s)	0.56	0.41	0.70	0.12	5.35
Horizontal velocity at the rising moment (m/s)with the left leg (m)	7.97	0.23	9.25	0.17	6.36
Digital Level (B)	5.84	0.28	6.42	0.16	11.02

Table (6)

The ratio of the development of the arithmetic means and standard deviation between the pre and post-tests of the study variables

Variables	The arithmetic mean	standard deviation
30m sprint time from flying start (%)	11.69	34.2-
Long jump stability (%)	14.45	54.21-
Vertical jump stability (%)	38.43	10.24-
Right-legged five-step distance (%)	6.89	48.71-
the distance of five hollows with the left leg (%)	9.38	77.46-
Flight time (%)	16.06	26.08-
Horizontal velocity at the rising moment (%)	9.93	42.85-
Numeric level (%)	11.69	34.2-

## Results

It is clear from Table (5-6) that there are statistically significant differences between the tribal and remote measurements in the study variables (30-meter sprint from the flying start, the vertical jump, the long jump from the stability and the distance of five hops with the right leg and the left leg from the stability and achievement) in favour of the dimensional measurement and this indicates On the effectiveness of codifying the exercises used in improving the motor and skill abilities in the long jump, in addition to the kinematic variables. These results are consistent with what George Dunn (1999) indicated "there are many types of regressive training that are limited to hops, jumps on hurdles, rebounds, and deep jumps, to develop the explosive ability of the two legs, which gives high results and response, and this is evident through the vertical jump test, the long jump and the sprint test.

### Discuss the results of jumping from stability

The results of the jump test of stability appeared in the Table, representing the rapid ability test for the two men that there are moral differences between the

tribal and post-test and in favour of the post-test. It had the effect of stimulating the working muscle groups, which led to the improvement of performance in an economical way and in a shorter time. As a result, the strength in the muscles of the material and the second of the legs developed in the horizontal and vertical direction, which led to better achievement, and this is what the researchers wanted to achieve in the objectives and hypotheses of the research. The development of the strength of the muscles of the legs for the jumping player leads to the development of the strength of the thigh and leg muscles and thus gives strength and agility to the player. With more force and speed while performing movements requiring a muscle extension, it is immediately followed by a shortening of the muscle itself. The exercises used are successful training methods for rapid strength development and development due to their effective contribution to activating the work of muscle fibres for quick work.

### **Discussing the results of the five-chamber test with a left and right leg**

Significant results appeared between the pre and post-tests and in favour of the post-tests for the different exercises in the deep jump, whether horizontal or vertical, which led to the development of rapid strength effectively through the speed of performance of the hops as a result of the work of the rhythmic contractions of the working muscles through effective muscle stretching, where he emphasized (Mohammed Hassan Allawi, Abul-Ela Abdel-Fattah) that “the ability to stretch in the muscles contributes to increasing the speed of the motor performance of the exercises used.” Also, the deep jump exercises are harmonic exercises between the arms and legs, which positively affected the level of performance of the hops that the members of the group performed.” This is consistent with what was found To him (Mohammed Reda and others, 1988) “that deep jump exercises help to learn and improve the coordination between the movement of the arms and legs.

### **Conclusions**

Through the results, the researchers concluded the following:

1. The varied jump in the deep jump style (horizontal - vertical) had a clear impact on developing the athletic ability of the two legs.
2. The varied jump in the deep jump style (horizontal - vertical) had a clear impact on the development of variables (maximum speed, flight time and horizontal speed), which led to the development of the level of achievement
3. Various jumps similar to performance affected the variables of the study in developing achievement.

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