

# The Effect of Weight Training and Rubber Ropes on Developing Special Abilities and Improving Achievement for Junior 100m Runners

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## Abstract

The objective of the study was to prepare exercises for developing special capabilities (weightlifting, rubber clothing), and determining the influence of the exercises on the achievements of younger runners, who were 100m, in which the researchers employed the experimental approach (and the creation of two equal experimental groups with pre/ post-test). The study has selected young riders (16-17) and (7) players for the 100m sprint competition. For the research experiment, they were divided by three players for each of the first (weight) and second (rubber ropes) experimental groups, each with a total of (18) trials per player and representation of young riders at the 100-meter sprint competition in the central region of the Euphrates. The data were extracted after statistical treatment after the test and measurement of the research variables. The researchers came up with several results, the main ones being:

- o Weight training was more beneficial than (rubber rope) workouts to develop leg strength with speed and explosive ability and boost competition performance.

- o There are no significant differences in building the strength characteristic of the quick arms for (100) m junior runners between (weightlifting) and (rubber rope) activities.

Then the researchers recommended:

- o The coaches of speed competitions must use appropriate exercises that effectively develop the special abilities and improve the runners' achievement.

**Keywords**— Weight Training; Rubber Rope Training; Junior 100m Runners

## 1. INTRODUCTION

The world is experiencing advancement in various aspects of life as a result of the growth of scientific knowledge and reliance on various fields of science, as well as benefiting from the results of studies and investigations in these areas, particularly in the sports field, which is

currently witnessing growth and progress in digital achievements achieved, whether at the level of world championships or Olympics, after the developed countries of the world developed great potential to raise To attain the objective of becoming good at a variety of different activities and events, such as athletics

competitions in their various forms, you must be very specific about how you prepare.

The discus throw competition is one of the most prestigious in athletics since it involves physical and motor ability, particularly among its practitioners. High levels are based on the same old training methods, but they demand reliance on many concepts, such as: change in training load, search for current ways and approaches in training, use of training aids and tools, and so on. Because this competition has specific criteria, using these principles in training programs is essential [3].

The researchers discovered that some throwing competition coaches in Iraq continue to practice traditional routines, which improve strength at the expense of speed and so do not reach high levels of success. So, it's critical to investigate this and devise exercises to help discus athletes develop their physical and motor abilities in order to achieve the greatest outcomes and be more successful.

The explosive ability of the arms, legs, and agility is one of the most influential capacities in the achievement, since the shooters' success is frequently linked to their supremacy in these capabilities [4]. There is a lot of value in research, especially when it comes to increasing the performance of advanced discus throwers in

discus throwing competitions through explosive exercises with varied resistances (30%, 40%), and 50%. (50 percent). These activities assist competitors develop these talents and, as a result, make them better in their jobs.

## 2. METHODS

The researchers used the experimental method (by designing two equal experimental groups with pre and post-tests).

### 2.1. Participants

The research community identified the junior players of the 100m sprint competition in the Middle Euphrates Governorate, whose ages ranged between (17-16) years, and their number was (7) players. Then a sample of (6) players was selected and distributed randomly into two experimental groups with (3) players for each group, and each player was given (6) tryouts with a total of (18) attempts for each group.

### 2.2. Research Sample Homogeneity

The researchers discovered homogeneity between the two groups when they analyzed the final test data. At the tabular value of 17 and the level of significance of 0.05, which amounts to 2.307, the homogeneity of the members of the two samples was found to be assured, as shown in Table (1):

Table (1)

*Shows the homogeneity of the individuals of the two research samples*

| Variables  | First Experimental (Weight) |                    |          | Second Experimental (Rubber Ropes) |                    |          | (F) computed value | Statistical significance |
|--|-----------------------------|--------------------|----------|------------------------------------|--------------------|----------|--------------------|--------------------------|
|  | Arithmetic mean             | Standard deviation | Variance | Arithmetic mean                    | Standard deviation | Variance |                    |                          |
| Length (cm)  | 1.77                        | 1.258              | 1.582    | 1.76                               | 1.227              | 1.505    | 1.563              | Insignificant            |
| Mass (kg)  | 71.2                        | 1.237              | 1.530    | 70.93                              | 1.289              | 1.661    | 1.261              | Insignificant            |
| Training Age (Month)                                       | 15.4                        | 2.564              | 6.574    | 15.2                               | 2.608              | 6.801    | 1.327              | Insignificant            |
| The flexibility of the legs (bend the torso forward from a | 13.435                      | 1.566              | 2.452    | 13.372                             | 1.542              | 2.377    | 1.602              | Insignificant            |

|  |       |       |       |       |       |       |       |               |
|--|-------|-------|-------|-------|-------|-------|-------|---------------|
| standing position)<br>cm   |       |       |       |       |       |       |       |               |
| Agility<br>(running the zigzag between the pillars with numbers) again | 9.251 | 1.684 | 2.835 | 9.351 | 1.711 | 2.927 | 1.788 | Insignificant |

### 2.3. Tools, means and devices used

#### 2.3.1. Research Tools

- \* Note.
- \* Personal interview.
- \* Test and measurement.

#### 2.3.2. The Means and Devices Used in the Research

- \* Manual stopwatch type (Smart time) number (2).
- Dell electronic calculator.
- \* Tripod number (2)
- \* Three Princo type laserdiscs.

\* Rubber ropes of different resistances and colours.

\* Weights of different weights.

### 2.4. Field Research Procedures

#### 2.4.1. Determining Special Abilities and Appropriate Tests to Measure them

Following an examination of pertinent references and sources, the researchers established the unique talents of 100-meter runners and the suitable tests to assess them, as illustrated in the following table:

Table (2)

*Shows special abilities and appropriate tests to measure them*

| S | Special Abilities                   | Measure Unit      | Tests  |
|---|-------------------------------------|-------------------|--|
| 1 | The distinguished speed of the arms | Times             | Flex and extend the arms from the front-facing position for a maximum number of (10) seconds |
| 2 | The distinguished speed of the legs | Metre & its parts | Long jump forward for (10) seconds   |
| 3 | Explosive ability of the legs       | Metre & its parts | stability Vertical jump  |

#### 2.4.2. The Pilot Experiments

History of the pilot experiment

The exploratory experiment was conducted on 10/3/2021.

Experimental sample

The sample consisted of (3) players who are part of the research community, and each of them was given (4) attempts, and they were chosen randomly.

Objectives of the pilot experiment

- \* Ensure the efficiency of devices and tools.
- \* Know the time taken for the test.

\* Knowing the validity of the tests for the research sample (integrity, reliability, objectivity).

\* Knowing the difficulties that researchers face to avoid them in the future.

The results of the pilot experiment

\* The tests and equipment used in the experiment are working.

\* The time to implement the experiment was (one day) and an average of (60) minutes of work.

\* All the candidate tests are honest and have high formative foundations.

### 2.4.2.1. The Scientific Foundations of Tests

#### 2.4.2.1.1. Validity of Tests

The researchers determined the validity of the substance or apparent form of the material by consulting pertinent sources and references and presenting these tests to a panel of experts and professionals in training, athletics, measurement, and assessment to establish their credibility.

#### 2.4.2.1.2 Stability of Tests

The researchers employed the test and retest approach to determine the test's stability coefficient during a five-day period from 10/3/2021 to 16/3/2021 on an exploratory sample of (3) players from the study sample, with each participant receiving (4) attempts. For one test, there were a total of twelve (12) attempts under the same conditions as the initial measurement.

The researchers calculated the reliability coefficient by calculating the ordinal correlation coefficient (Spearman) between the results of

the first and second measurements and calculating the relationship's significance using the maximum random value of the correlation coefficient (table) of (0.57) at a sample size of (12), a degree of freedom of ten (10) and a level of significance of 0.05 (3).

#### 2.4.2.1.3. Objectivity of Tests

To ascertain the objectivity of the tests used in this study, the researchers hired international arbitrators in athletics to record and evaluate the results of tests administered on the exploratory sample's vocabulary. The researchers then treated the results statistically, extracting the ordinal correlation coefficient (Spearman) to express the objectivity coefficient for each of the special abilities. By means of research. The results indicate that the tests employed in the research are very objective because the estimated correlation coefficients are more than the maximum random value of the correlation coefficient for the sample size (12), degree of freedom (10) and level of significance (0.05), which is (0.57). (3).

Table (3)

*It shows the coefficients of reliability, objectivity, and the maximum random value of the correlation coefficient*

| Special Abilities                   | Tests  | Measurement Unit      | Stability Coefficient | Objectivity Coefficient | Maximum Random Value of Coefficient |
|-------------------------------------|--|-----------------------|-----------------------|-------------------------|-------------------------------------|
| The distinguished speed of the arms | Flex and extend the arms from the front-facing position for a maximum number of (10) seconds | Number of repetitions | <b>0.87</b>           | <b>0.88</b>             | <b>0.57</b>                         |
| The distinguished speed of the legs | Long jump forward for (10) seconds   | Metre                 | <b>0.88</b>           | <b>0.86</b>             | <b>0.57</b>                         |
| Explosive ability of the legs       | Long jump from standing forward  | Metre & its parts     | <b>0.87</b>           | <b>0.89</b>             | <b>0.57</b>                         |

### 2.4.3. Tribal Measurement

The tribal examinations were conducted on 20 March 2021 at the Najaf Sports Club stadium. As the research sample consisted of six players ranging in age from (17-16) years, they were divided into three groups for the research experiment: three players for the first experimental research group (weights) and three players for the second experimental research group (weights) (rubber ropes). Each player received six attempts, for a total of eighteen attempts in each group.

#### 2.4.3.1. Equivalence of the Two Samples

The researchers established equivalence between the two groups in each of the variables examined. To establish a statistically significant difference between them, the results were analyzed using the (T) test. It looked to have substantial differences that were not significant since the computed value was less than the tabular value (2.032) at the 0.05 level of significance, sample size (36) and degree of freedom (34), all of which indicate that the two groups are equal, as shown in Table (4).

Table (4)

*It shows the equivalence of the two samples in the studied variables*

| Variables                                   | First Experimental (Weight) |                    | Second Experimental (Rubber Ropes) |                    | (F) computed value | Statistical significance |
|---|-----------------------------|--------------------|------------------------------------|--------------------|--------------------|--------------------------|
|   | Arithmetic mean             | Standard deviation | Arithmetic mean                    | Standard deviation |                    |                          |
| The distinguished speed of the arms         | 12.154                      | 1.141              | 12.138                             | 1.143              | 0.508              | Insignificant            |
| The distinguished speed of the legs         | 30.148                      | 1.124              | 30.215                             | 1.227              | 0.655              | Insignificant            |
| Explosive ability of the legs               | 2.123                       | 0.105              | 2.113                              | 0.098              | 0.458              | Insignificant            |
| Achievement in a running competition (100m) | 11.936                      | 0.075              | 11.929                             | 0.102              | 0.415              | Insignificant            |

### 2.4.4. Applying Exercises (Weightlifting, Bungee Cords)

The researchers employed standardized exercises for both groups in terms of duration, intensity, and technique of training (high-intensity interval training and repetitive training). Nonetheless, the distinction is in the mechanism of action. The first group focuses on implementing its training via the use of (weights), while the second group focuses on

implementing its training through the use of (rubber ropes).

### 2.4.5. Telemetry

The post-measurement was conducted on 1/6/2021 for members of the research sample at the Najaf Sports Club stadium, taking into account the conditions and directions for conducting these tests in the same available settings and capabilities as those utilized in the tribe measurement.

## 2.5. Statistical Methods Used

- 1- Final test (F).
- 2- (T-test) for independent samples.
- 3- (T-test) for correlated samples.
- 4- The mean is arithmetic.
- 5- Contrast.
- 6- Standard deviation.

## 3. RESULTS

### 3.1. The Effect of Weight Training in Developing the Development of Special Abilities and Improving the Achievement of the Junior 100m Runners

Table (5)

*It shows the differences between the pre and post measurements for the first experimental group (weights)*

| Variables                                   | Tribal measurement  |                            | Telemetry           |                            | (F) compute<br>d value | Statistical<br>significan<br>ce |
|---|---------------------|----------------------------|---------------------|----------------------------|------------------------|---------------------------------|
|   | Arithmeti<br>c mean | Standar<br>d deviatio<br>n | Arithmeti<br>c mean | Standar<br>d deviatio<br>n |                        |                                 |
| The distinguished speed of the arms         | <b>12.154</b>       | <b>1.141</b>               | <b>12.138</b>       | <b>1.143</b>               | <b>0.508</b>           | <b>Intangible</b>               |
| The distinguished speed of the legs         | <b>30.148</b>       | <b>1.124</b>               | <b>30.215</b>       | <b>1.227</b>               | <b>0.655</b>           | <b>Intangible</b>               |
| Explosive ability of the legs               | <b>2.123</b>        | <b>0.105</b>               | <b>2.113</b>        | <b>0.098</b>               | <b>0.458</b>           | <b>Intangible</b>               |
| Achievement in a running competition (100m) | <b>11.936</b>       | <b>0.075</b>               | <b>11.929</b>       | <b>0.102</b>               | <b>0.415</b>           | <b>Intangible</b>               |

In Table (5), we show the statistical estimates obtained by runners in the (100) m competition in the governorates of the Middle Euphrates, which showed significant differences due to the calculated value being greater than the tabular value (1.740) at the significance level (0.05), the sample size (18), and the degree of freedom (17).

To explain and defend the researchers' findings, we present the following:

Weight training holds a significant place in the program for preparing athletes due to its critical role in the development of all talents.

When we compare the tribal and distant measurements of (the force defined by speed

for the legs, the force defined by speed for the arms), we observe statistically significant discrepancies between the tribal and remote data. The floor first, and then the increase in the average speed of the weights used to perform the activity second, in order to complete the required exercise and repetitions [1]. And the exercises administered to the members of the first experimental group had a beneficial effect, as evidenced by the results of speed-based strength tests. Weight training has been shown to improve strength and muscular ability, hence boosting speed and skill performance in several studies [2].

Additionally, for (the two men's explosive ability), we observed statistically significant

variations between the two pre- and post-measurements. This demonstrates that weight training has a major impact on the development of the two men's explosive abilities. The moral progress in leaping is a result of the weight training administered to the first experimental group, which resulted in an increase in the explosive ability of the leg muscles as well as an increase in the circumference of the lower extremities as a result of strength development [3].

Finally, the competition's achievement, as evidenced by statistically significant differences

between tribal and remote measurements, and as evidenced by the development of the competition's special abilities as a result of weight training, as the achievement is not contingent on the development of strength and ability alone, but rather is the result of the I Each of them has a function and a job to play in obtaining high levels.

### 3.2. The Effect of Rubber Ropes Training on Developing Special Abilities and Improving Achievement for Junior 100m Runners

Table (6)

*It shows the differences between the pre and post measurements for the second experimental group (rubber ropes)*

| Variables                                   | Tribal measurement  |                            | Telemetry           |                            | (F) compute<br>d value | Statistical<br>significan<br>ce |
|---|---------------------|----------------------------|---------------------|----------------------------|------------------------|---------------------------------|
|   | Arithmeti<br>c mean | Standar<br>d deviatio<br>n | Arithmeti<br>c mean | Standar<br>d deviatio<br>n |                        |                                 |
| The distinguished speed of the arms         | 12.138              | 1.143                      | 14.527              | 1.162                      | 3.467                  | Intangible                      |
| The distinguished speed of the legs         | 30.215              | 1.227                      | 32.336              | 1.487                      | 6.861                  | Intangible                      |
| Explosive ability of the legs               | 2.113               | 0.098                      | 2.257               | 0.047                      | 4.056                  | Intangible                      |
| Achievement in a running competition (100m) | 11.929              | 0.102                      | 11.764              | 0.106                      | 4.753                  | Intangible                      |

We note in Table (6) the statistical estimates obtained by the runners of the (100) m competition in the governorates of the Middle Euphrates. Which appeared with significant differences because the calculated value is greater than the tabular value (1.740) at the significance level (0.05), the sample size (18) and the degree of freedom (17), which showed the actual effect in developing the special abilities of the runners and improving the

achievement of the runners covered by the research and representatives of the second experimental group, which was trained with rubber ropes.

To explain and defend the researchers' findings, we present the following:

Members of the second experimental group conducted the rubber rope exercise in order to develop particular abilities and thereby improve their performance during competitions.

The researchers attribute the development of (the speed characteristic of the legs, and the speed characteristic of the arms) to strength training combined with speed using rubber ropes, which had a significant effect on developing the strength of the leg and arm muscles, as well as increasing the strength and speed of muscle contraction.

The workouts used increased the number of muscle fibers involved in performance, as indicated by the good test findings. Concerning the (explosive ability of the leg muscles), we note the moral differences between pre and post measurements, as the researchers believe that the rubber ropes exercises stimulated the necessary muscle fibers, resulting in an increase in strength, because a muscle can be affected entirely or in part by an influencer. Naturally, this is dependent on the intensity of the

stimulus, since the exercises performed were effective, directed, and upward to the working muscles, resulting in the growth of the two men's explosive power.

Finally, the researchers attribute the increase in achievement to the effectiveness of rubber ropes training in developing (special abilities) both the speed characteristic of the arms and legs and the explosive ability of the two legs, which resulted in a positive return in the 100m sprint competition results for members of the second experimental group.

### 3.3. Differences in the Effect of (Weightlifting - Rubber Ropes) Training in Developing Special Abilities and Improving Achievement for the (100) M Junior Competition Runners

Table (7)

*It shows the significant differences of the investigated variables between the first experimental group (weights) and the second experimental group (rubber ropes) in the dimensional measurement*

| Variables                                   | Tribal measurement |                    | Telemetry       |                    | (F) compute d value | Statistical significance |
|---|--------------------|--------------------|-----------------|--------------------|---------------------|--------------------------|
|   | Arithmetic mean    | Standard deviation | Arithmetic mean | Standard deviation |                     |                          |
| The distinguished speed of the arms         | 14.554             | 1.134              | 14.527          | 1.162              | 0.121               | Intangible               |
| The distinguished speed of the legs         | 34.106             | 1.537              | 32.336          | 1.487              | 6.215               | Insignificant            |
| Explosive ability of the legs               | 2.376              | 0.052              | 2.257           | 0.047              | 3.746               | Insignificant            |
| Achievement in a running competition (100m) | 11.651             | 0.081              | 11.764          | 0.106              | 3.486               | Insignificant            |

Assume we shed some light on the points made in Table (7). In such situations, significant differences arise since the calculated value is

more than the tabular value (2.032) at the 0.05 level of significance, the sample size (36) and the degree of freedom (34) for the study variables (the speed characteristic of the two



legs). The explosive ability of the two legs) and a runner's accomplishments (100 m). Except for the variable (speed-differentiated force between the two arms), which showed no significant variations in the two experimental groups' dimensional measurements.

To explain and defend the researchers' findings, we present the following:

The improvement and growth of the two experimental groups as a result of their training, the diversity of their resistance, and the disparity in their muscular strength performance are natural and expected. It was automatically and favourably reflected in the research's final findings.

Due to the potential for weight training to create explosive ability, the weight training performed by the members of the first experimental group over an eight-week period worked to develop (special ability) speed with strength for the muscles of both legs without omitting one of them. And its efficacy in transferring the beneficial training effect of increasing strength characterized by speed is a result of the huge number of exercises dedicated to strength and speed development, as well as the repetitions and continuity of these exercises.

We discovered that the second experimental group (weights) outperforms the first experimental group (rubber ropes) in (leg explosive ability, leg speed characteristics) because the exercises included applications of kinetic speed of performance and rapid motor transfer of the two legs.

A form of resistance in which the speed of the transitional movement has been increased in order to increase muscle strength and continuity without decreasing the rate of force, characterized by the speed of its exercises that overcome the force of the earth's attraction to the body in addition to the resistance provided by weights.

Additionally, as shown in Table (7), there are no statistically significant differences in the arms' speed-distinguishing strength test. The researchers attribute this to the weight and rubber rope exercises performed by the research sample, which are based on the foundations and principles of sports training science. The

competition's unique characteristics were taken into account in order to accomplish the requisite adaption. Gradually increasing the load scientifically and rationally resulted in the effectiveness of both exercises (weights, rubber ropes) and an increase in the level of strength as measured by speed in the research sample's arms.

Finally, we discovered that the first experimental group (weights) performed better than the second experimental group (rubber ropes) in (leg speed, explosive ability), implying that the first group performed better in leg strength and ability.

The superiority of the first experimental group was evident in the accomplishments of the (100) junior runners, as the (strength as measured by speed and explosive ability) of the two men was a deciding factor in their distinguished performance in sprint competitions [4]. And training the legs with weights results in a greater degree of strength and capability in the body's muscles than other activities [5].

## 4. DISCUSSION

### 4.1. Conclusions

- 1) Training (weightlifting, rubber ropes) had a significant effect on developing special abilities and improving the achievement of the 100m junior runners.
- 2) The (weight) exercises were more effective in developing the strength characterized by speed and the explosive ability of the legs and improving the achievement of the competition compared to the (rubber ropes) exercises
- 3) There are no significant differences between weight training and (rubber ropes) in developing the speed characteristic of the arms of the 100m junior runners.

## 4.2. Recommendations

The coaches of speed competitions must use appropriate exercises that effectively develop the special abilities and improve the runners' achievement.

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