






RESEARCH ARTICLE

## Effect of Multi- Resistance Exercises on Some Physical Variables and Level of Performance in 100-Meter Short Sprint Effectiveness

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### Abstract

Research aims to identify impact of multi - resistance exercises program on some physical variables and level of performance among two runners of activities of short Sprint Effectiveness 100 meters through use of new methods and means in sports training that helps improve some physical and motor capabilities and level of performance. researchers used experimental curriculum, and researcher was chosen by research sample in intention of (18) runners from Basrah Governorate clubs in activities of microscopic, 100 meters, youth category (16) years, results of research showed that multi -shape resistance exercises have a positive impact on level of achievement in two distances of distances short, which was represented in physical variables and level of achievement, and that re are differences between two groups (experimental and controlled) in changes of physical capabilities and level of achievement, as experimental group that used program of multi -resistance training (experimental) has surpassed control group that used program (classic) most important recommendations were: Take advantage of training program in terms of multiple forms of resistors to develop level of achievement in activities of short sprint 100 meters. It is important to focus on enhancing the physical abilities of young individuals during their developmental phases by utilising various types of resistance training. This is because it has a beneficial effect on improving their overall performance level. Conduct further studies that replicate the existing research methodology, with resistors that are distinct from the ones now being used.

### Keywords

Multi- Resistance Exercises, Physical Variables, 100-Meter Short Sprint Effectiveness

## INTRODUCTION

In recent times, there has been a growing global interest in sports training that focuses on enhancing and developing athletic performance in individuals of various ages (Gallahue & Donnelly, 2007). Modern sports training plays a crucial role in the lives of athletes, as it is a well-structured educational process based on solid scientific principles. Its aim is to help athletes reach their optimal performance level and ultimately achieve their sports goals (Paramitha et al., 2021). To accomplish this, trainers must carefully plan and

organize training sessions, considering the physical and technical abilities of their players,

within a unified framework. This is particularly important during races and competitions (Otte et al., 2020). The global pursuit of scientific advancements in training methods aims to disseminate knowledge and concepts to coaches in a user-friendly manner, enabling them to achieve better levels of proficiency (Kingsbury, 2022). There has been a noticeable enhancement in the overall worldwide performance in trauma races, necessitating the implementation of scientific training methods to effectively address this progress (Bodemer, 2023). Utilizing suitable

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training techniques and strategies enhances the motor performance and fitness aspects of short programs based on scientific principles, while avoiding conventional training methods (Cormier et al., 2022). It is imperative to maintain consistent training efforts from a young age to adulthood (Lau & Lee, 2021; Zatsiorsky, Kraemer, and Fry, 2020) argue that utilizing a training method that integrates various resistance tools based on scientific principles leads to improved physical, muscular, and motor fitness, while also acting as a preventative precaution against accidents. The progress of sports levels is contingent upon various factors, such as enhancing the functional capacity of sports body systems (Fyfe, Hamilton & Daly, 2022). This can be achieved through the development of training methods and techniques that aim to enhance performance and attain the highest levels of accomplishment (Rivaldo & Nabella, 2023). Training methods play a crucial role in realizing this objective (Leal Filho et al., 2019). And that one of most important advantages of resistance exercises is its diversity and many methods, as Swartz, Floyd and Cendoma (2005) indicates that provision of a kind of resistance that ranges from a few or non-resistance and begins to increase and difficult Where a person can continue to increase strength generated during every movement of movement, and that resistance includes central and central components of repetition, but to ensure that this happens perfectly during full movement of movement, resistance must be prepared properly, and the research problem explain this to fact that coaches use a large number of auxiliary and private exercises without realizing relative importance, which means that there are many exercises that have a limited effect in training process, and despite this they are used excessively within training units, which leads to a lot of effort and loss of a lot of time in training for training and training paths that are useless and work in direction of general and not muscular work, which affects outputs of general achievement level of effectiveness, and therefore researcher tries to use multi-shape resistance

sprint athletes by implementing structured training exercises to increase effectiveness of training with lowest effort and shortest time as well Breaking monotony and boredom barrier during training units, and research aims was identify the effect of using multi-shape resistance exercises on some physical variables and level of achievement in effectiveness of Short Sprint Effectiveness 100 meters.

## MATERIALS AND METHODS

### Participants

Researchers used experimental approach as one of research means to solve research problem, as experimental curriculum is "a deliberate and seized change on specific conditions of a specific incident and note resulting changes in same incident to interpret it and with design of experimental and control groups and Pre-test and post-test.

This article's necessary ethics committee permissions were obtained with College of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq. Social Sciences Ethics Committee Commission Date: 17.01.2024 Issue/Decision No: 10. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki, and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

### Field Research procedure

#### Community and sample research

The research community determines players of Basrah Governorate in effectiveness of Short Sprint 100-meter youth category (16-17) years of age, which (18) players and thus represents 80 % of original research community.

**Table 1.** Shows Homogeneity of sample through values of kurtosis factor

Variables	Unit of measurement	M	SD	Torsion coefficient
Age	year	17.02	2.04	0.656
Length	Cm	158.32	6.01	0.575
Wight	Kg	61.82	0.516	-0.344

Training age	year	2.11	1.00	0.177
Achievement 100 m	Sec	11.2	0.004	0.051

It is clear from Table (1) that extracted values fall within natural curve, "as values of coefficient kurtosis are limited between (+3) and (-3)". Where "good distribution of sample can be known from number of Values, proximity to each or, or separation, and separation from each or, and thus we have a measure of amount of homogeneity of statistical group and the research tools was Chinese -made weight and length device, Lap-top Cori7, 2 whistles, a 30-meter measuring tape, 24 training cones, rubber tapes, weight weights, pulse examination device, blacks loading with an iron with different weights, and medical balls of different weights

### **Tests used in research**

Test ran by jumping in 10 seconds (Haj-Sassi et al., 2011). Test aim: measuring strength with speed.

Tools: Time Hour, Line drawn on Earth is a signal to start jumping, person.

Test procedure: Laboratory stands behind starting line with a distance determined by laboratory to carry out approximate cod Measuring distance later.

**Calendar:** Distance traveled by laboratory is recorded in 10 seconds.

Test (30) meters from start flying (Kavanaugh et al., 2011).

**Test aim:** measuring maximum speed.

**Tools:** Time Hour, three parallel lines drawn on ground distance between first lines second is 10 meters and between second and third line 30 meters).

### **Test procedure**

Laboratory stands behind first line, and upon hearing starting signal, laboratory will be enemy until he crosses third line, time is calculated from second line to third line.

Running test (40) meters of low start (Mudian, Setiawan & Lanos, 2021).

### **Purpose of test**

Measuring transitional speed.

### **Tools**

Time Hour, Determination of Parallel 40 meters. The first line represents the starting line represents the finish line. Performance description: - laboratory stands behind the starting line from low starting position, and when hearing absolute whistle, laboratory begins with running and at highest possible speed until finish line is passed.

Method of registration: Laboratory is given only one attempt and calculation of time that laboratory takes from starting line to finish line in second.

Pre- Test: Researchers conducted Pre- test on 8/2/2023, at exactly four o'clock in field of Faculty of Physical Education and Sports Sciences / Basrah University. Researcher was fixing all conditions of test.

### **Exploratory Experience**

Exploratory experiment was conducted on 9/2/2023, where it aimed to achieve following: Ensure validity of destruction and measurements required for tests for purpose of conducting president. Ensure validity and calibration of devices and tools used under research. Training assistants in methods of testing procedures for measuring variables under research, and results of this experience were confirmed by achieving all aim.

### **Main experience (training program)**

Start of work on training program with multi -shape resistance on 12/2/2023, as program included (24) training units distributed to (8) weeks at fact that (3) and training plots per week. The training program aims to improve (physical capabilities and achievement level) of short 100 meters effectiveness for young people by designing a training program using exercises with multi -shape resistors.

### **Foundations of proposed training program**

Researcher observed following scientific foundations when designing proposed training program:

**First:** Program is appropriate for age stage (research sample) and subject to general aim.

**Second:** Defining the aim of a program and aims of each stage of its implementation.

**Third:** Determining most important duties of training and ease of availability of capabilities, tools and devices used.

**Fourth:** Considering individual differences between players.

**Fifth:** Considering evidence of evidence to reach sample members to normal state.

Appropriate formation of components of training (performance time, rest time, repetition time.)

**Sixth:** gradual increase in pregnancy and appropriate progress guidance for training loads and dynamics of training loads.

### **Determining Time of Training unit**

Each of them agreed of Time of training unit at this age ranges between (65: 100) minutes, by (3-4) training units per week (Church et al., 2010). Based on the above, number of training units was determined by (3) training units per week for experimental group.

**Determine time of training unit parts**

Time of training unit for experimental group was determined from (65) minutes to (75) minutes, according to scientific sources, studies, and previous research. Considering the time of training unit, which is determined by a time (65 - 75 BC), researcher distributed time of training unit parts.

**Content of training unit parts**

**Warm-up for 15 minutes.**

Determine Resistors used in training program

Resistors used in sports field in general, which can be used in field of short -ranked activities, have been identified in particular and based on large number of performance and possibility of designing many special exercises with possibility of placing composition to suit dental stage and thus determined resistances used under research in following (resistance to colleague's body, Medical balls resistance, rubber tape resistance, weightlifting resistance).

**Determining part of Resistance part**

Experts in the field of sports training agreed that the time of part of resistance training in training unit ranged from (30: 55) minutes and based on foregoing time of part of resistance training was determined from 40: 50 minutes.

**Table 2.** Shows the results of tests in pre- test and posttests for experimental group

Tests	M /Unite	Pre- Test		Post-test		T Value	T Table	Indication
		M	SD	M	SD			
Running 10 -Sec jumping	meter	50.4	0.021	58.1	0.039	3.11		sig
Running test 30 m from start flying	Sec	3.84	0.046	3.78	0.098	2.34	2.11	sig
Running 40 m from low start	Sec	4.89	0.033	4.69	0.076	2.64		sig

Under degree of freedom (16) and indication level (0.05)

Through results shown in Table (2), it became clear that re are differences between

**Dynamic formation for formation of training for physical preparation**

During special numbers phase, researcher used during various stages of program basic formation 1: 2 as gradient in degree of pregnancy was used through use of medium pregnancy during first stage and high pregnancy during second stage and maximum pregnancy during third stage.

**Post-test:**

Researchers conducted a posttest on 12/5/2023 at exactly three thirty in afternoon in field of Faculty of Physical Education and Sports Sciences / Basrah University, and researchers were keen to fix all variables and conditions related to test.

**Statistical method**

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Independent Samples T-test were used in the analysis of normally distributed data.

**RESULTS**

Presenting, Analyzing and Discussing Results. Presentation of results of Arithmetic mean, standard deviations and achievement in pre-test and posttests of research sample, analysis, and discussion:

mimetically averages and standard deviations of pre-test and post-tests for three tests.

**Table 3.** Shows the results of tests in pre- test and posttests for control group

Tests	M /Unite	Pre- Test		Post-test		T Value	T Table	Indication
		M	SD	M	SD			
Running 10 -Sec jumping	meter	51.1	0.011	54.2	0.027	3.11		sig
Running test 30 m from start flying	Sec	3.82	0.078	3.86	0.071	2.34	2.11	sig
Running 40 m from low start	Sec	4.74	0.052	4.71	0.093	2.64		sig

Under degree of freedom (16) and indication level (0.05)

**Table 4.** Shows the results value of calculated experimental group (Running 10 -Sec jumping test)

Group	M /Unite	Pre- Test		Post-test		T Value	T	Indication
		M	SD	M	SD			
Experimental group	Meter	50.4	0.021	58.1	0.039	3.11	2.11	sig
Control group	Meter	51.1	0.032	56.2	0.123	2.24		sig

Under degree of freedom (16) and indication level (0.05)

**Table 5.** Shows the results value of calculated experimental group running (test 30 m flying start)

Group	M /Unite	Pre- Test		Post-test		T Value	T	Indication
		M	SD	M	SD			
Experimental group	Sec	3.84	0.101	3.78	0.203	2.49	2.11	sig
Control group	Sec	3.85	0.233	3.80	0.176	2.21		sig

Under degree of freedom (16) and indication level (0.05)

**Table 6.** Shows the results value of calculated experimental group running (Test 40 m from low start)

Group	M /Unite	Pre- Test		Post-test		T Value	T	Indication
		M	SD	M	SD			
Experimental group	Sec	4.89	0.113	4.69	0.103	2.342	2.11	sig
Control group	Sec	4.88	0.214	4.75	0.214	2.201		sig

Under degree of freedom (16) and indication level (0.05)

## DISCUSSION

Researchers believe that improvement in level of achievement in experimental group came because of use of gradual rest periods between repetitions and groups, which helped to restore stability better. For internal physiological operations of working motor parties and functional devices in an organized manner, which was confirmed by Brewer (2017) who indicated that "sports training is an organized repetition to perform motor paths and make changes in building se paths and in building organs and internal devices on which training load is located With aim of upgrading level of achievement (Kraemer and Ratamess 2004) and researcher attributes improvement to formulation of required aim of multi -shape resistance exercises that were carried out in a clear scientific way in a manner commensurate with nature of performance, which is confirmed by (Kraemer and Fleck 2005) that in fact, essence of training planning is a planning to achieve physiological reactions to body towards any physical pregnancy on it and through body's response to achieving physiological adaptation and level of sporting performance increases, and this

confirms (Tyler, 2013) who indicated that "developing training curricula for goals basic, and choice of exercises that suit nature of effectiveness in each training unit and in time term of units is one of most important criteria for success of training curriculum (Ericsson, 2014) agrees with him that "use of exercises that are consistent with nature of its performance with general form of performing specialized skills lead to better results in acquisition of strength.

Through results shown in Table (3) for control group researcher believes that the increase in the amount of muscle strength is an important factor in some sporting activities more than some other activities, as it has proven that sporting activities based on muscle capacity can improve performance and development through strength training as strength exercises increase the speed and ability of muscle contraction. This is confirmed by (Fragala et al., 2019), who indicated that "the use of rising programs with burden helps to improve motor performance using moving contracting and that the training programs designed to develop muscle strength in public muscle groups in a specific sport can be used as additional exercises complementing the regular



training program for these sports as an effective way To improve motor performance and kinetic fitness (Boyle, 2016).

Through results shown in Table (3,4,5,6), researcher attributes improvement to role of multi-shape resistance exercises that have contributed effectively to development of distinctive strength of speed and improvement of digital level of performance, which was confirmed by Herold et al., (2019), as it is necessary to use unconventional training methods that contribute In developing functional capabilities of athlete by increasing pregnancy in quantity and quality to extent that compels athlete to adapt together physically and psychologically to overcome contradiction between requirements of pregnancy and achievement of achievement (Barkley, Major & Cross, 2014). researchers also attributes se results to positive impact of proposed training program using multi -shape resistors, where it was considered that collection of exercises used is like nature of performance, as indicates that main role of qualitative exercises in various resistances lies in same path of performance and thus works on muscular groups concerned with performance (Knudson, 2013). Researchers believe a progress that proposed training program, whose contents included various exercises using various resistors to develop fitness ingredients. In addition, this progress of proposed training program, which had a positive impact for experimental group more than (classic) program that was implemented on control group, as follow -up program included training with various resistances that led to development of different physical capabilities, which in turn contribute to flowing Mark and optimal work for muscles and thus work on economy in effort and n develop level.

### Conclusions

Multi-shape exercises showed a positive impact on level of achievement in two-distances 100 meters, which were represented in physical changes and achievement. Improvement rates in achievement level of physical changes and level of achievement in two groups varied, while improvement rates were better for experimental group.

### Recommendations

Take advantage of the proposed training program in terms of multiple forms of resistors to develop level of achievement in activities short

distances. Necessity of paying attention to developing special physical capabilities of two mourning's of short distances through use of multiple forms of resistors, because of positive impact on raising level of achievement

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### Conflict of Interest

There is no personal or financial conflict of interest within the scope of the study.

### The Ethics Committee

College of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq. Social Sciences Ethics Committee Commission Date: 17.01.2024 Issue/Decision No: 10.

### Author Contributions

Research Design:HA , IB, AF; Statistical analysis:HA , IB, AF; Preparation of the article: HA , IB, AF; Data Collection:HA , IB, AF

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Appendix (1)  
A model of multi -shape resistance exercises  
First week (Saturday)/ Intensity of performance: (80 - 100 - %)

Main Department	Repetition1	Performance Time	Repetition2	Performance Time	Repetition3	Performance Time	Groups	Comfort Etween Groups	Total Time
Practice 1	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	3.60m
Practice2	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	3.60m
Practice3	3	60	4	60	3	60	2	1.30 sec	3.60 m
Practice4	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	3.60 m
Practice5	3	15	4	15	3	15	2	1.30 sec	2.30 m
Practice6	3	15 Sec	4	15 Sec	3	15 Sec	2	1.30 sec	2.30 m
Practice7	3	15	4	15	3	15	2	1.30 sec	2.30 m
Practice8	3	15 Sec	4	15 Sec	3	15 Sec	2	1.30 sec	2.30 m
Practice9	3	15 Sec	4	15 Sec	3	15 Sec	2	1.30 sec	2.30m
Practice10	3	10 Sec	4	10 Sec	3	10 Sec	2	1.30 sec	1.40 m
Total	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	27.3 m