

THE EFFECT OF VARYING INTENSITY TRAINING ON THE DEVELOPMENT OF STRENGTH ENDURANCE AND SOME BIOCHEMICAL VARIABLES FOR YOUNG 400M RUNNERS

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ABSTRACT

The rapid development in achieving high levels of sports in various fields, whether in team or individual games, goes in line with the technology of sports training science in general and with the science of biomechanics in particular. And the strong and successful coach derives his strength and success from knowledge and if he wants to maintain that he must . Always be aware of everything that is new and to take science as a guide and you refer to it in the field of training through the science of biomechanics, which contributed to the progress of the motor performance of man in general and of the athlete in particular. And through kinetic analysis, the coach relied on the knowledge of minutes of movement especially the fast movement and the technical performance which depends on the integration of the mechanical conditions so it found the importance of avoiding the training path at one pace, which prompted the researcher to search and investigate through research in finding a new method, and she found delving into a type or method of modern methods that were not addressed and knowing its impact on young runners for the effectiveness of 400m, which is a method The varying stresses and its impact on the achievement, strength and biochemical variables of the research sample. The study aimed to know the effect of this method on the research variables and imposed There are differences between the pre and post tests of the research sample in the biochemical variables and the strength of achievement. The researcher concluded that exercises with varying stresses contributed to improving the strength and achievement of the biochemical variables. The researcher recommends conducting research similar to other activities of athletics, and comparison in different training methods.

Keywords: exercises of varying intensity, strength endurance, biochemistry

1-1 INTRODUCTION TO THE RESEARCH AND ITS IMPORTANCE:

Sports training is a purposeful and directed educational process with scientific planning for the performance of players of all levels and according to their abilities (buds, juniors, and advanced players) in a multifaceted preparation (physically, skillfully, tactically, psychologically) to reach the highest possible level. Thus, sports training does not stop the process of continuous improvement and progress of the level Players in high-level sports in various fields of sports, whether in team or individual sports, keep pace with the technology of sports training science in general and with the science of biomechanics in particular, since a strong and successful coach derives his success and strength from science, and if he wants to maintain that, he must always be aware of all What is new and to take science as a guide and refer to it in the field of training through the science of biomechanics, which contributed to the progress of human motor performance in general and sports in particular. As the main content of this science in the field

of physical education is to study and describe the causes of movement. Where it provides the most appropriate kinetic solutions using kinetic analysis by relying on modern scientific devices and methods to reach the global digital achievement for various games, especially athletics events. And it is difficult for the coach to know the minutes of the movement, especially the fast movements, as is the case in the number, and the technical performance, which is the basis for achieving great achievements, which depends on the integration of mechanical conditions in an activity that requires strength and speed according to the laws that determine the performance of this activity, as well as the correct angles for it. Hence the importance of research in avoiding the path of training at one pace and reaching results by switching between force loads or by changing the load to know the effect of these exercises on force endurance, which is a method in which an attempt is made to reach the maximum degree of effectiveness by using force in different ways. To classify this study is something new.

1-2 Research problem

Endurance is an important physical ability needed by most games that rely on repetition of strength. As this ability consisting of endurance and strength appears in every game in proportion to the performance requirements of that game, and endurance plays a role in training and racing, as it requires maintaining the load for a long time and is the basis for the level in activities that require overcoming high resistance for a long time. Through the researcher's review of the research and letters and her interview with a number of specialized trainers, she found that most of the training curricula did not give focused importance to studying the effects of this type of training for strength in different ways and according to the biochemical variables, which prompted her to use this training method for a sample of young people in the 400m event to know the effects of this The type of training and its positive dimensions, so that through the recommendations of the research, it can be delved into by the trainers for several activities.

2 RESEARCH METHODOLOGY AND FIELD PROCEDURES

2-1 Research methodology

Choosing the practical approach to solve the research problems is essential, as "the research problem imposes the approach that can be used (1: 47), so the researcher adopted the experimental approach due to its suitability to the nature of the research problem with the design of one experimental group.

2 - 2 research sample

The goals that the researcher creates for his research and the procedures that he will use will determine the nature of the sample that he chooses. Therefore, the researcher selected a sample for her research by age method from the 400m youth event players, whose number is (5) players who were chosen to apply the proposed exercises under discussion after obtaining approval to conduct the experiment on them through Taking part of the time of the applied part to apply the curriculum within the period of their special preparation.

2-3 Tools, means and devices used in the research.

- 2 Nikon video cameras
- Reflective phosphorescent markers for marking points
- 1 Toshiba laptop
- Barriers of different heights
- stationary
- tape measure
- Drawing scale
- Kenova program for motion analysis
- The force measuring system (Dyna foot) number (1), 2017 model
- Stopwatch
- Test and measure
- Boxes of different heights 30, 35, 40, 45
- 10 barriers
- Medicine balls of different weights
- Weights of different weights

1-4 Research procedures

2-4-1 The tests used in the research

The researcher looked at the sources and took the opinion of the experts in determining the most important variables for the research, and after it was agreed upon, which are as follows:

First: Measuring the force exerted by the two men during the first 10 meters by using the Dynavote device.

Test procedures: Measuring the force applied to the two legs by using the system of measuring the force applied (dyna foot) for the 400 m youth players. This system is one of the modern and advanced devices that are placed under the foot (a pair of shoes), as it gives us the amount of mechanical distribution of pressure and force in addition to other kinematic and kinematic parameters. It is related to the balance of the feet and the difference between them, as well as the imprint of the feet and the pressures applied by the parts of the feet, whether the heels, metatarsals, the right side or the left side. And the system for measuring force variables on the ground is a system prepared for therapeutic, mathematical and scientific purposes. Its aim is to know the variables (force and pressure) that are applied by the foot regions. It consists of four parts, which is the data delivery base (it is a foot pin that is placed in the shoe with a Bluetooth wire, and a receiver device The signal is connected to the laptop computer, and the system works after wearing the device on the leg of the tested player and installing it on a tank containing electronic sensors spread inside it worn by the player and entering the data of the player's age, height, weight, and gender.

According to the need of the study, the system for analyzing sports movements (dyna foot) depends on the Bluetooth wireless frequency to exchange information between the program installed on the calculator and the sensors that are placed under the foot and give the system a location estimated at (20 m) in the open air and multiply in closed halls.

Second: Test (standing - hands behind the head) bending and fully extending the knees within (45 seconds) (Dabni) (1: 36)

- The aim of the test: to measure the endurance of the strength of the muscles of the legs

Third: 400m running test to measure achievement (2:68)

The objective of the test: measuring the achievement of the achieved 400-meter run

Third / biochemical variables

The biochemical variables were chosen after presenting them to a group of experts with expertise and specialization* which is appropriate for the research and they are as follows.

- 1- Starting speed m/s
- 2- Departure angle in degrees
- 3- The angle of departure of the body
- 4- The height of the body's center of gravity
- 5- The number of steps
- 6- Step length
- 7- Step frequency
- 8- Achievement

Field procedure steps

• Videography.

The research sample was filmed for the pre and post tests, and the time was recorded, and then the values for the bio-kinematic variables of the research sample were extracted through a camera that monitors and visualizes the runner along the race distance.

An attempt was given to each player, and after the completion of the pre-test, the biochemical variables were extracted through the following laws related to the steps of the race:

Distance every 400m ÷ number of steps withdrawn from photography

We extract the length of one step, then we extract the average speed by dividing a distance of 400 m by its time, then we extract the frequency of the steps through the following law (speed = step length x frequency).

2-5 Exploratory experiment

The researcher conducted the exploratory experiment on a sample (2) of young 400m players who were not excluded from the main experiment.

- 1- Knowledge of the work of the assistant work team
- 2- Fixing rest and work times during the training program
- 3- Controlling the intensity during the training units, and it was conducted on 4/10/2022 at ten in the morning at Al-Shaab Stadium.

2-6 pre-tests

The researcher conducted the tribal tests on 4/15/2022 at ten o'clock in the morning at Al-Shaab Stadium on the main research sample.

2-7 Training Curriculum

The researcher prepared exercises after reviewing the sources and references related to the science of training and athletics and surveying the opinions of the previously mentioned experts and specialists on how to work in the training unit and the appropriate training loads.

- The application of the training curriculum took 4 weeks at a rate of 3 training units per week (Sunday, Tuesday, Thursday), and thus the total number of training units reached (12) training units
- Implemented the training curriculum from the period of special preparation.
- The duration of the work was (50-90) minutes from each training unit in the main part of it.
- The number of exercises was 6, three exercises with short intensity and three exercises with medium intensity. The training load was determined by adjusting the components of the load between the body, intensity and rest.
- The researcher relied, in determining the rest period between the groups, on the pulse rate to restore the semi-normal functional state, so the vigorous exercises were the return of the pulse to 120 n / d, while in the exercises of medium intensity, the return of the pulse to 130 n / d
- The researcher took into account that the used exercises should be similar to the performance requirements during the competition for the purpose of benefiting from the effects of these exercises
- The researcher used the contrasting training method in the way of high and low intensity interval training. High and low interval training is a method used in all stages of training (3:240).

2-8 post exams

The researcher conducted the post-tests on 5/15/2022 at ten o'clock in the morning at Al-Shaab Stadium, under the same conditions in which the pre-tests were conducted.

2-9 Statistical means

- 1- Arithmetic mean
- 2- Standard Deviation
- 3- The T value for the corresponding samples

3 - PRESENTATION, ANALYSIS AND DISCUSSION OF THE RESULTS

3-1 Displaying the results of the pre and post tests of the strength tests of the research sample

Table (1) It shows the arithmetic means, standard deviations, and the pivotal and tabular t-values of the pre and post tests of the research sample.

variants	measruing unit	pretest		post test		Calculated T	Tabular T	Moral Connotation
		M	S	M	S			
A test of strength (dynavote) for the right-hand man	T n	933.54	37.88	104.43	38.55	3.79	2.78	Moral
Dynavote test for the left leg	T n	799.22	29.8	941.38	31.761	7.28		Moral
Bearing the strength of the muscles of the legs	The number of times	49.5	8.21	55.77	7.48	3.021		Moral
achievement	second	59.88	9.72	54.09	8.78	2.91		Moral

through table (1), which shows the differences between the pre and post tests of the strength tests, where the axial t of the strength test appeared right (Dynafoot) 3.79, the strength left 7.28, and the force load for the muscles of the two legs 3.021, which is greater than the tabular (2.78), and this gives the differences significant. The researcher attributes the significant differences to The training curriculum prepared by the researcher, which includes the different training method, the type of exercises and the intensity used to develop strength and force endurance, as these varying stresses worked to avoid the training path at one pace and then contributed to the development of the types of strength, and this is confirmed by (Hussein Ali and Amer Fakher 2010) "The method Through it, the maximum degree of influence is achieved through the use of force in different ways" (4: 89) and (Raisan Khraibet) indicates that "regular and programmed training and the use of measured types of intensity in training and the use of types of rest and optimal between repetitions leads to the development of achievement." (5:481)

Table (2) It shows the arithmetic means, standard deviations, and the pivotal and tabular t-values of the kinematic variables of the pre- and post-tests.

variants	measruing unit	pretest		post test		Calculate d T	Tabular T	Moral Connotation
		M	S	M	S			
Cruising speed	m/s	6.93	1.56	7.38	1.64	2.88	2.78	Moral
departure angle	degree	23.40	2.79	22.85	2.82	3.054		Moral
Body starting angle	degree	16.3	1.93	17.6	1.04	5.58		Moral
High center of gravity of the body	cm	0.81	0.021	0.86	0.001	4.92		Moral
number of steps	count	125	9.91	120	9.88	7.61		Moral
stride length	cm	1.62	0.051	1.78	0.025	3.46		Moral
step frequency	to	3.19	0.83	3.37	0.87	6.21		Moral
step frequency	hesitate							Moral

Through Table No. (2), which shows the calculated tabular t value of the biomechanical variables for the pre and post tests of the research sample, where the value of (T calculated respectively for the biomechanical variables is (2.88, 3.0542, 5.582, 4.92, 7.61, 3.46, 6.21). It is greater than The tabular value of 2.78, which means that the differences are significant. The researcher attributes the significant differences to the training program and the rationing method for the varying stresses, which helped in increasing the motor range of the joint and lengthening the participating muscles, and then increasing the stride length at the maximum speed stage. And to the principles of improving the maximum speed and achieving the optimal proportion between the length of The step and its frequency to build the basic base in the processes of developing biomechanical variables as well as strength exercises that work to improve the frequency of the step for runners and to the strength exercises that the player exerts against gravity and in a manner commensurate with the weights used in the exercises. And (Turki Ahmed and Sabaa Bu Abdullah 2016) indicate that “athletic performance and its access to possible stresses requires following a set of contexts and steps related to kinetic analysis and biomechanical variables and linking them to improving training and controlling its intensity” (6: 185)

The various stress exercises have contributed to improving the gradient in speed from the beginning of the first steps to reaching the maximum speed, which is within the limits of (30 m), since from the beginning of the competition the runner is subject to Newton’s second law and its requirements that the acceleration of the body is directly proportional to the force affecting it, and this is confirmed by (Hossam Abdel-Kadhim Rahima 2018) “Speed training for body parts acquired the arms’ kinetic speed at their reference point during a fast run, and then had a positive effect on the player’s speed, based on the biomechanical principles of sprinting” (7: 47)

The training curriculum with varying stresses, training units, type of exercises and training loads contributed to the adaptation of the nervous and muscular system, which in turn led to the development of the speed and angle of departure. Steps are among the first priorities of improvement.

4 - CONCLUSIONS AND RECOMMENDATIONS

4-1 Conclusions

- 1- The training curriculum with varying stresses contributed to improving the strength tests (dynavote) for the right and left.
- 2- The training curriculum with varying intensities has an effective impact on developing force tolerance for the research sample.
- 3- The impact of the training curriculum in developing the achievement of 400m for the research sample according to the exercises included in the training curriculum, in which varying stresses were used.
- 4- The training curriculum with the varying stresses used in the curriculum contributed to improving the bio-kinematic variables of speed, starting angle, length, number and frequency of the 400-m hostile step.

4-2 Recommendations

In light of the researcher's findings, the researcher recommends the following

- 1- Athletics coaches, in all its effectiveness, should use the ways and method of training with varying intensities, because of its positive effect.
- 2- Comparing training ways and methods for one of the athletics activities and finding the best of these methods.
- 3- Applying similar research to other athletics events using varying intensity exercises

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Sample training unit Time of the main section The objective of the training unit Day and date - Optimization of maximum speed -Develop strength

S	exercise	Performance time	repetition	work-to-rest	ratio	resting groups between	stress groups
1	Running a distance of 30 meters from the flying hand	6 s	10	1: 3	4	120 s	intensity Same extreme
2	Running a distance of 50 meters from the flying hand	9 s	6	1: 3	4	120s	
3	Jumping on hurdles with a height of 50 cm	12 sec	8	1: 3	4	120 s	
4	Vertical jump from stability	4 s	8	1: 3	4	120 s	intensity Medium
5	Jogging a distance of 20 m	4 s	10	1: 3	4	120 s	
6	Jumping hurdles at a rated height of 5	5 s	8	1: 3	4	120 s	