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Anaerobic endurance training in the method of high-intensity alvetric training and its effect on some physiological and physical variables and the achievement of the 200 m sprint for young people

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ABSTRACT

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The physical and physiological preparation of all body systems is of great importance in reaching the best sports achievements, as the numbers recorded by many and many world champions are a kind of fantasy after the progress that has occurred in the sciences related to the sports field, especially the science of sports training and the philosophy of training.

Research Problem:

The (200m) event is considered one of the short events that depends on the quality of anaerobic endurance to increase the efficiency of the anaerobic ability of the runner, as the improvement of anaerobic ability improves the work of the heart.

Search to find out:

The Effect of Using Anaerobic Exercises in the High Intensity Interval Training Method on the Achievement of the 200m Sprint

There are significant differences in the achievement of (200 m) sprint between the pre- and post-tests and in favor of the post-test

Research Areas :-

Human field: For the players of Al-Qurna Club for the sports season 2024/2025 and who are registered in the Iraqi Central Athletics Federation for the youth category.

Research Methodology:

The researcher used the experimental method to suit the nature of the research

Conclusions and Recommendations:

Conclusions:-

The drills had the most obvious effect on the experimental group under research in the achievement of the 200 m sprint.

Recommendations:-

Athletics coaches can use the high-intensity interval training method instead of to develop the speed trait of 200 m runners and for all age groups.

1-1 Introduction and the importance of the research:

The physical and physiological preparation of all body systems is of great importance in reaching the best sports achievements, as the numbers recorded by many and many world champions are a kind of fantasy after the progress that has occurred in the sciences related to the sports field, especially the science of sports training and the philosophy of training.

Despite the scientific advances in the field of training, more research and studies are needed to come up with many scientific facts in order to reveal the best methods and methods to develop each sporting event optimally.

In the 200 m sprint competition, which is one of the short-distance sprint competitions and relies very heavily on anaerobic endurance according to the recorded numbers (19:19) seconds, which is one of the exciting events in the Olympics and internationally and beloved by the athletics fans, it is not possible to develop the digital level of the runner without benefiting from the scientific foundations and the correct training programs related to the training method used.

From this applied scientific application, the attribute of (anaerobic endurance) is one of the important physical qualities needed by the runner who practices the 200-meter sprint, which can be developed in several ways that contribute to improving the achievement in the said distance runner.

The training method used by the researcher (high-intensity interval training) is one of the most used training methods to develop aerobic endurance in short-distance runners, including the 200 m runner.

It is worth mentioning that the high-intensity interval training method is considered one of the important training methods and is highly relied upon by many local and international coaches in developing the maximum speed of runners, as the high intensity in this method may reach (90% to 100%) because it is related to the development of speed and knowing the extent of its impact on the pulse rates during the implementation of the training unit and the achievement of (200 meters) sprints.

1-2 Research Problem:

The (200 m) event is considered one of the short events that depends on the attribute of anaerobic endurance to increase the efficiency of anaerobic capacity, as the improvement of anaerobic ability improves the work of the heart, and leads to increasing the cardiac work process with high efficiency and improving the passages used in feeding the capillaries in the muscles, and that the improvement of anaerobic ability improves the processes of metabolism and the conversion of food into energy in the muscles in the matrix of energy production systems to the approximate percentage of the contribution of aerobic energy sources The anaerobic in the (200 m) sprint event is approximately (95%) anaerobic and within the limits of (5%) antenna, and this indicates and confirms the importance of the method used by the researcher in developing the achievement in the (200 m) sprint event, and because of the decline in the Iraqi numbers recorded in the internal and external championships, which do not exceed (21) seconds, while the numbers recorded globally under the barrier of (20) seconds the researcher decided to delve into this research problem.

1-3 Research Objectives:

The research aims to identify:

1. The effect of using anaerobic exercises in the method of high-intensity interval training in the achievement of the 200 m sprint.
2. Knowing the effect of the exercises used on the achievement of (200 m) enemy
3. The effect of using anaerobic endurance method of high-intensity interval training on physiological variables.

1. There are significant differences in the achievement of (200 m) between the pre-test and the post-test and in favor of the post-test.

2. There are significant differences in the pre- and post-physical tests and in favor of the post-tests.
3. There are significant differences in the physiological variable between the pre- and post-tests and in favor of the post-test.

1-5 Research Areas:

1. **Human field:** For the players of Al-Qurna Club for the sports season 2024/2025 and who are registered in the Iraqi Central Athletics Federation for the youth category.
2. **Spatial field:** Al-Qurna Club stadium in Basra Governorate.
3. **Temporal Domain:** From 15/2/2025 to 19/5/2025.

Research Methodology:

The researcher used the experimental method to suit the nature of the research.

3-2 Research Population and its Sample:

The research population was deliberately selected from the short-distance runners (200 m) in the Al-Qurna Sports Club for the youth category and with the age of (18) years and (6) runners for the sports season 2024-2025 and registered with the Iraqi Central Athletics Federation, and a homogeneity process was carried out among the members of the research sample in the variables of height, biological age, training age and weight.

Table (1)

It shows the arithmetic mean, standard deviation, and coefficient of difference for the physical measurement and homogeneity of the research sample.

Wrenching coefficient	Standard deviation	Broker	Arithmetic mean	Unit of Measurement	Variables
0.00	0.63	18	18	year	Biological age
0.97	1.03	176	176.67	poison	Length
0.00	0.89	77	77	kg	Weight
2.449 -	0.408	3	2.83	year	Training Age

Table (1) shows the value of the coefficient of difference and the arithmetic mean equal to the variables under study, which means the homogeneity of the members of the research sample.

Table (2)

It shows the arithmetic mean, standard and mean deviation, and coefficient of difference for the physiological and physical measurement of the research sample.

Wrenching coefficient	Standard deviation	Broker	Arithmetic mean	Unit of Measurement	Variables
0.968	0.516	64	64.33	Z/D	**Pulse before voltage**
0.000	1.265	170.00	170.00	Z/D	**Pulse after effort**

2449 -	408.	18.00	17.83	second	**150m enemy**
1.701 -	15211.	23.368	22.9117	second	**200 m Achievement**

Table (2) shows the value of the coefficient of difference for the variables under study (pulse before and after physical exertion, 150 m sprint test and 200 m sprint) because there are no significant differences, which indicates the homogeneity of the research sample.

3-4 Devices and Tools Used:
- Rhythm stopwatches measure time to the nearest 0.01 seconds (6)
- Stethoscope (6) to measure the pulse rate.
- Electronic Length Measuring Device (OSK)

3-5 Experimental Design:
The experimental design included an experimental group, which undergoes a pre-test to know its condition before introducing the experimental variable, then being exposed to the experimental variable, and then the post-test is performed, so the difference between the results of the pre-test and post-test is due to their being affected by the experimental variable.

3-6 Means of Data Collection:
3.6.1 Determination of the measurements and tests used:
- Physical measurements (measurement of body length).
- 150m sprint test.
- 200m sprint test.
- Physiological measurements*.
- Pulse rate measurement (at rest, just after a 200 m sprint)

3.6.2 Specifications of measurements and tests used:
3.6.2.1 Body length measurement.
3.6.2.2 Pulse rate measurement.
Measuring the resting pulse rate using a stethoscope by hearing the sound of the heartbeat in the area below the left breast, by sitting the testator on a bench and counting the number of heartbeats within (60 seconds) and measuring the pulse rate also after the runners have finished 200 m sprint immediately after the athlete reaches the finish line and in the same way as the resting measure.
Second: The 150 AD test.
- **Purpose of the test** : Measuring the speed tolerance.
- **Tools used** : Specialized athletics stadium Stopwatch Whistle Registration form (6) temporary masks Assistant staff.

Test Description: The testers stand at the beginning of the start and from the standing position and when the sound of the whistle is heard by the absolute: the time of the testers' enemy is calculated when the whistle is heard, and the clocks are stopped when the testers reach the finish line, the time is calculated to the nearest tenth of a second.
Third: The 200 m enemy test:
The purpose of the test: to measure achievement through time.
- **Tools used** : Dedicated stadium Whistle Clocks
- **Test Description**: Low start and when the whistle is heard, the testers proceed to the finish line at full speed.

3.6.2.3 Survey Experiment:

The exploratory experiment is a practical training for the researcher to identify for himself the negatives and positives that he encounters during the test to avoid them, and the exploratory experiment was conducted on (2) runners outside the experimental group.

The survey experiment was conducted on 15/2/2025.

3.8.5 Tribal Tests and Measurements:

In the current research, the tests and pre-measurements were conducted on two days on 16/2/2025, (150) m was tested, and on the second day 17/2/2025 as follows: The pulse variable was measured at the time of rest, then the 200 m runner test, and then the pulse was measured directly.

3.8.6 Implementation of the Training Program:

After the completion of the pre-test, the implementation of the training program began, and the program lasted (12) weeks with (3) training units per week, i.e. (36) training units were implemented. The implementation of the training program was started on the day after the test and for the pre-test on 18/2/2025, the training curriculum was distributed as follows:

- Preparatory Stage: Its duration is (12) weeks divided into:

A. General Preparation : (4) weeks

B. Special Preparation : (4) weeks

2- Pre-Competition Stage: (4) weeks

Each training module consisted of three sections as follows:

A. Preparatory oath.

B . Main Department.

c. Final section.

3.8.7 Tests and Dimensional Measurements:

Tests and dimensional measurements were conducted on the research sample after the completion of the implementation of the training program on 19/5/2025 and in the same mechanism as conducting the test and telemetry.

3-9 **Statistical Methods:**

The results of the research were extracted by the following statistical methods:

- Arithmetic mean.
- Standard deviation.
- Torsion coefficient.
- Test (T).

Table (3)

It shows the arithmetic mean, standard and median deviation, coefficient of variance, calculated T-term , and pre- and post-tabularity of physiological research variables.

Significance Level	value t	After the training program			Before the training program			Units	Measurements
		Standard deviation	Broker	Arithmetic mean	Standard deviation	Broker	Arithmetic mean		
026.	-2,226	1.033	60.00	60.67	0.516	64	64.33	Z/D	Pulse before voltage
027.	-2,214	837.	150.00	159	2651.	170.00	170	Z/D	Pulse after exertion

It is clear from Table (3) that the level of significance is less than 0.05 in all the variables under study (physiological pulse), which means that there are significant differences with statistical significance between the tribal and dimensional measurements and in favor of the dimensional measurements.

1. Presentation, analysis and discussion of physiological results:

In the light of the results obtained from Table (3), it was shown that there were significant differences in the pulse rate during rest and after the performance of physical exertion before and after the implementation of the training program, when comparing the pre- and post-measurements of the experimental research sample after the implementation of the training program.

The significant decrease in the pulse rate in (rest and after physical exertion) after the implementation of anaerobic training in the method of (training proposed by the researcher) (high-intensity interval training), is explained by the researcher by the functional improvement that occurred in the cardiovascular system, as anaerobic training works to raise the efficiency of the heart, and leads to the occurrence of adaptive processes in the circulatory and respiratory systems significantly. The researcher also believes that organized training leads to a decrease in the pulse rate, as it results in an increase in the heart's ability to grow and develop and an increase in the action of the parasympathetic nerve, which works to slow down the pulse rate, as the heart becomes more efficient and able to pump blood and increase its flow to the working muscles, thus confirming an increase in its supply of energy and oxygen (78:1), until the adaptation of the heart is only positive in the functional efficiency of the heart due to the regular effort that occurs in it. It occurs as a result of regular training programs that cause functional changes in the heart, represented by the expansion of the heart cavities, the increase in the strength of the heart muscle, and the increase in the size of the heart.

Astrand stressed that there are functional changes of the heart that occur after performing sports effort to be able to supply the working muscles with their increasing needs of oxygen needed to perform the exertion, and this is done by increasing both the cardiac output and the speed of blood flow (112:4).

He also pointed out that "practicing athletic training leads to an increase in the thickness of the heart muscle, and then an increase in its strength, and an increase in the volume of blood rushed from it in one stroke", adding that "anaerobic endurance training leads to a functional adaptation in the body's systems due to muscular exertion, such as an increase in the number of heartbeats, and added that "training works on the adaptation of the heart, blood circulation and the muscular system, and the runner becomes able to increase the heart rate as his athletic level improves. (103:4)

Table No. (4)

Shows the arithmetic media, standard deviations, calculated and tabulated (T) value of physical variables before and after the training program of the research sample.

Significance Level	value t	After the training program			Before the training program			Units	Measurements
		Standard deviation	Broker	Arithmetic mean	Standard deviation	Broker	Arithmetic mean		
023.	2,271	0.408	16.00	16.17	408.	18.00	17.83	second	150 m
028.	-2,201	0.1075	22.3350	22.3683	15211.	22.368	22.9117	second	200m

It is clear from Table (4) that the level of significance is less than 0.05 in all the variables under study (physical), which means that there are significant differences between the pre- and post-tests and in favor of the post-tests.

By observing Table (4), it is found that the mean of the 200 m enemy time in the pre-test of the experimental group under study was (22.9117) seconds with a standard deviation of (15211). While the mean of the post-test was (22.3350) seconds with a standard deviation of (± 0.1075). The value of (T) calculated between the pre- and post-tests for the time of 200 m was (2.201), which is greater than the significant value of (028) at the degree of freedom (9) and in front of a significant level of (0.05), which indicates that the differences are significant between the two tests and in favor of the post-test, which achieves the first hypothesis. The test of (150) m was the mean of (17.83) seconds before the implementation of the training program and the standard deviation of (408). While the arithmetic mean after the implementation of the training program was (16.17) and standard deviation (408) and the value of (T) was 2.271) which is greater than the significance value (023) and at a degree of freedom (0.059), which confirms the differences between the pre- and post-test and in favor of the post-test test.

The researcher attributes the reasons for the development of physical variables, to the training method, which had a prominent role in the occurrence of adaptive processes by stimulating as many motor units as possible in physical work (123:2), as well as stimulating neural signals, which led to the speed of muscular responses, as well as the (200) m race is considered one of the races that need a fast reverb speed in the movement of the legs and arms and the harmony between the movements of the working muscles. From the practical and objective point of view, the differences and the level of improvement that appear in the arithmetic media, in all tests, and in favor of the dimensional tests, give evidence of the extent to which the exercises are well selected, how to prepare and implement them during the preparation stages and the sections of the training unit, in a harmonious way between the type of speed and intensity that they develop, in addition to the performance time, its repetition, and the stage of its performance in the preparation stages and the training unit (3:89).

5. Conclusions and Recommendations:

5-1 Conclusions:-

1. The drills had the most obvious effect on the experimental group under research in the achievement of the 200 m sprint.
2. The training prepared by the researcher had a clear effect on the experimental group in physiological and physical variables.
3. There is a clear correlation between high-intensity interval training and research variables (physiological, physical and 200 m achievements)

5-2 Recommendations:

1. Athletics coaches can use the high-intensity interval training method instead of to develop the speed trait of 200 m runners and for all age groups.
2. Trainers should emphasize anaerobic exercises when training speed competitions, including the (200 m) sprint event.
3. The necessity of the trainers conducting physiological measurements of the runners after the completion of each training period of the preparation stages.
4. Researchers were urged to conduct similar studies and other physiological or biochemical variables and to find out the extent of their impact on the effectiveness of the 200 m sprint.

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