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The effect of hypoxic training on developing speed Endurance and achievement for runners

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Abstract

In the introduction, the researcher Endurance on the sporting achievements that continue in various sports, including athletics, which broke records from time to time, which indicates that there are efforts made by scientists and coaches in arriving at the best ways, means and methods to achieve new sporting achievements by conducting studies and research in This is scientifically proven, and because athletics with all their effectiveness is one of those activities that are widely popular all over the world due to its excitement and excitement in competition in reaching the fastest, highest and strongest in its effectiveness, the 400-meter running activity is one of the fast-running activities that are classified Among the activities that are performed with the maximum speed and less than the maximum and due to their relative long distance, they need physiological requirements and physical ability commensurate with their performance and the energy system working in them, which is the non-oxygenic energy system. It helps improve the adequacy of runners' functional devices and raises their susceptibility.

One of the uncommon methods at the local level is the hypoxic training, which means the lack of oxygen in the muscular tissues, especially the working ones. Therefore, the importance of this study shows the use of hypoxic exercises in developing a complex physical ability which carries the speed of the 400-meter running effectiveness as well as in its completion.

The research problem, there are many methods and methods that are used in training, and hypoxic (hypoxia) is one of the methods used in training internationally, especially in activities that are characterized by high intensity and oxygen deficiency occurs and after the researcher polled the opinions of some coaches, experts and players, I found that this means and this type Training is uncommon at the local level, especially for speed Endurance and 400 meters running. Therefore, it is necessary to think about finding methods, methods and training methods that raise the sufficiency of the functional and physical equipment of the player to continue his performance with high intensity, resisting fatigue and lack of oxygen, so the researcher decided to conduct a field study using hypoxia exercises in the blood (hypoxic) using an oxymeter to measure the rate of oxygen deficiency Which is used for the first time in training locally and that was imported from the United States of America, as

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well as the use of masks for the mouth and nose to impede the inhalation of air as well as the use of a little rest between exercises with a heart rate indicator that is not returned in a way that meets the body's need of oxygen consuming that will be 140 z /Dr.

And the use of these exercises in developing special speed Endurance and completing a 400-meter run, a modest contribution from the researcher in the use of this type in the 400-meter running training.

Research Objectives: Developing hypoxic exercises in developing special speed Endurance and achievement for runners. Knowing the effect of hypoxic exercises in developing special speed Endurance . Identifying the effect of hypoxic exercises in accomplishing a 400-meter run..

Key words : *hypoxic training , speed Endurance , achievement for runners*

I. Introduction

The athletics with all their effectiveness is one of those games that are widely popular all over the world in terms of following the course of its competitions because of the excitement and excitement it contains in the competition to reach the fastest, highest and strongest in its activities, and the activity of running 400 meters is one of the fast-running activities that are classified It is one of the activities that are performed at a speed less than the maximum. Given the relative long distance that cannot be performed at the maximum speed, and the development of this event requires special physical capabilities and physiological requirements commensurate with its performance and the energy system operating in it is the non-oxygenic energy system because its performance time falls Within the time of this system is between 30 seconds and 2.30 minutes. Therefore, in order to develop runners in this event, it is necessary to choose physical capabilities that are commensurate with their requirements, as well as in choosing training methods in implementing exercises used in training and using methods and methods that help in improving the adequacy of the functional equipment For runners and raise their physical ability, and then affect improvement in achievement. One way that is not common at the local level is hypoxic training, which means hypoxia. in the muscle tissue, especially the working one, and this is a factor that affects the muscle work in contraction and extensibility and leads to a decrease in the ability to continue performing at high intensity as a result of biochemical variables that appear as a result of intense performance and lack of oxygen, especially lactic acid.

The oximeter is one of the devices used by a physician and athlete to measure the rate of oxygen saturation in the blood for the purpose of diagnosing pathological conditions in addition to knowing the lack of oxygen in the blood during the performance of sports training, so the importance of this research appears in the use of the oximeter in studying the effect of exercises with hypoxia (hypoxic) to develop special speed Endurance Achievement and ran 400 meters.

Research problem

The running efficiency of 400 meters of fast jogging is according to the IAAF classification, which leads to extreme intensity from extreme to extreme due to its long distance and according to the

specifications and runability. Therefore, the development of this activity requires interrelated physical and physiological requirements. From the physical point of view, speed Endurance is one of the most important physical capabilities that this activity requires. Physiologically, the acute shortage of the amount of oxygen consumed and the accumulation of the amount of lactic acid in the muscles that generate fatigue What hinders the continued performance with high intensity is the most important characteristic of this effectiveness.

There are many methods and methods used in training. Hypoxic is one of the methods used in training internationally, especially in activities that are characterized by high intensity and where there is a lack of oxygen. After the researcher polled the opinions of some coaches, experts and players, I found that this method and this type of training is not common at the local level Especially to withstand speed and to run 400 meters.

Therefore, consideration must be given to finding the training methods, methods and means that raise the sufficiency of the functional and physical equipment of the player to continue his performance with high intensity, resisting fatigue and lack of oxygen.

research aims

- Putting the hypoxic exercises into developing the special speed Endurance and completing the 400 meters run for two runners

- Learn about the effect of hypoxic exercises in developing special speed Endurance .

- Learn about the effect of hypoxic exercises in achieving a 400-meter run.

Research hypotheses

- There are significant differences between the pre and post tests in the development of special speed Endurance as a result of using hypoxic exercises.

- There are significant differences between the pre and post tests in completing the 400-meter run as a result of using hypoxic exercises..

II. Research Methodology

The choice of the curriculum depends mainly on the nature of the problem that is to be solved, as the researcher used the experimental design in order to suit the nature of the study, and the design of the one group was used before and after the test .

Research community and samples

The nature of the problem to be studied led to the selection of the sample, as the research sample was intentionally chosen from my hostile, ages (17-18 years), for the effectiveness of the 400-meter running and for the sports season 2018-2019, and they represent the runners who are training in athletics training centers in Baghdad Governorate , "It is possible for the researcher to intend to choose

the sample to generalize the results to the whole, especially when the sample is homogeneous, a small sample is sufficient to represent the community of origin.

Research Tools

To provide a set of devices and tools necessary for the purpose of using them to solve the problem, whatever those tools, and to make sure that these tools are suitable for research to achieve hypotheses. In fact, the researcher used the devices, tools and means that helped the researcher to conduct his research, as follows:

- tape measure.
- Chinese-made medical scale to measure weight.
- Registration forms.
- US-made masks for the nose and mouth, number 10.
- (SONY) video camera.
- Whistle number 1.
- stopwatch hours.
- A device for measuring the percentage of oxygen in the blood (oxymeter), US-made, number 1
- Spyrometer for measuring respiratory variables, number 1.
- Japanese-made pressure device, number 1.

The Testes

Measured variables:

- Vital Capacity Test, Ability anaerobic , Speed Endurance Test (450 meters running)

Applied Test

The training curriculum prepared by the researcher included hypoxic exercises, which were considered a training method used to develop a physical ability to Endurance speed and accomplish the effectiveness of running 400 meters by using two methods, the first of which are masks placed on the nose and mouth, which impede the process of breathing properly during the exercise, leading to a deficiency The amount of oxygen supplied to the body, which causes fatigue and makes the functional devices work, not having oxygen. This method was used during the first month.

As for the other used in the second month, which is the use of returning the heart rate 140 zd / d during rest to perform or repeat the second exercise, this makes the duration of rest or recovery of the hospital sharply deficient, meaning that the period is not sufficient to replace some of the oxygen consumed before starting Performing the other exercise, depending on the duration of the rest period in the high intensity vortex method, 110-120 zd / d for young adults and 120-130 zd / d for applicants.

The use of 140 zd / d will have difficulty in the rest period, and this was the researcher's goal of using the two methods and the hypoxic exercises, knowing that the second method was not previously used within the hypoxic exercises.

In order to monitor the lack of oxygen in the blood, and for fixation, the researcher used for the first time an oximeter device. After the end of each exercise, he used the finger on the player to show the device reading the amount of oxygen saturated with blood, and if there is a deficiency, it is an indication that the exercise is within the required goal. I noticed that the oxygen deficiency increases with the runners after the end of the last exercise, and the rate of oxygen saturation with hemoglobin varied among the runners, as the individual differences in functional, physiological and privacy aspects of the sample members were evident when measured by the device, and accordingly the period of performance and rest were varied among the members of the sample, Therefore, it was difficult to determine the hospitalization period for each player. As the hospitalization exercises given by the researcher help to return the pulse to the required number by using flexibility exercises appropriate to the respiratory system in terms of inhalation and exhalation that helped to return the required pulse. The researcher used the device to find out the pulse of the runner as well, because the comfort that is fixed in the training curriculum depends on the pulse that the runner reaches in order to re-exercise again. The number of training units reached 24 units, with an average of 3 training units per week. They were distributed on Saturday, Monday, Wednesday. Endurance ing speed is given 2-3 times a week. The curriculum was implemented during the special preparation stage, for speed tolerance, 400-meter running, and hypoxic exercises, and the curriculum took 8 weeks for the period from 22/2/2019 to 28/4/2019.

Ripple pregnancy was also used for the first month (1-3) by gradually increasing the pregnancy in the second and third week and then reducing it in the fourth in preparation for the second month, as the training intensity in the first week reached 85%, the second 87%, and the third 90%. In the fifth week, I used other more specific exercises, the intensity was 90%, the sixth was 92%, and the seventh was 95%. The training volume reached (32800) meters distributed in the first month (18400) meters, and the second (14400) meters. Also, I used less and more training distances and the same race distance.

III. Results and discussed

View and discuss search results:

Table (1) show The mean and standard deviation in the pre- and post-tests and the calculated and tabulated value of (T) in the pre- and post-tests of the sample set for the vital capacity test.

the test	Pre-Test		Post-Test		Calculated value of T	Table (T) value	df	Significance
	A	Std	A	Std				
Vital capacity	5.244	0.221	5.774	0.247	21.547	1.83	9	Sign

The differences in the vital capacity index indicated that the type of exercises that were used in the training curriculum, which was characterized by reducing the amount of oxygen reaching the working muscles, which leads to the adaptation of the body to compensate for the shortage of oxygen in the blood, where the body resorts to compensate for the lack of oxygen by increasing the speed of breathing or increasing Red blood cells, as increasing the speed of breathing is the reflex response of the respiratory system to compensate the oxygen consumed during the effort and the amount of oxygen deficiency that reaches the muscles as a result of putting a muzzle on the nose and mouth that works to block the oxygen entering the body and here the body also increases the red blood cells in a compensatory state Because of the lack of oxygen, because the oxygen bond is linked to the hemoclope inside the red blood cells1.

Regular training leads to an increase in the number of red blood cells responsible for the transport of oxygen in the blood that leads to an increase in the percentage of reserve hemoglobin in the blood.

In addition, the respiratory muscles have a role in compensating for the lack of oxygen, as the lack of oxygen in the blood reaches the working muscles, and during a few rest after high intensity. When the muzzle is raised from the mouth and nose, the number of breaths increases, as well as the depth of breathing to replace the oxygen, and since the breathing muscles are skeletal muscles that develop by training, as the strength and degree of elasticity of the muscles increases during the inhale and exhale deeply, which leads to the absorption of a greater amount of air during the inhalation and in view of the fact that the muscles Breathing is a skeletal muscle, so its strength and endurance can be increased by training approaches to develop these muscles in terms of strength and endurance because of its importance in controlling pulmonary ventilation. "The effect of training on lung function, as it was mentioned that practicing sports training regularly leads to positive functional changes In the respiratory system, these changes achieve additional flexibility in the muscles of the chest, which increases their ability to expand and expand, which leads to an increase in the volume of air inhaled and thus helps to increase the amount of oxygen in the process of gas exchange between the blood and the alveoli and the economy in the movement of breath due to the increase in vital capacity. The young training method used in vocabulary exercises contributed to improving vital capacity by improving the ability of the lungs to absorb more air. "The most important characteristic of interventional training is the improvement of vital capacity because recovery times enable the heart to reach the highest level of blood pumping.2"

The researcher measured the vital capacity due to its correlation with the percentage of hemoclopene saturation with oxygen that was measured by the oxymeter device, the increased saturation leads to an improvement in the vital capacity, and because the hypoxic exercises are directly related from the physiological point of view to developing the vital capacity, it was necessary for the researcher to measure and discuss its results**.**

Table (2) shown The mean and standard deviation in the pre- and post-tests and the calculated and

tabulated value of (T) in the pre- and post-tests of the sample set for the Ability anaerobic test.								
the test	Pre-Test		Post-Test		Calculated value of T	Table (T) value	df	Significance
	A	Std	A	Std				
Ability anaerobic	0.244	0.021	0.779	0.047	7.547	1.83	9	Sign

Through the results shown above, the researcher has noted that the training method that included hypoxic exercises has helped in developing the non-oxygenic lactic capacity of the research sample and as shown in the results of the post-test, since that ability is the ability to continue in the muscle effort in the absence of oxygen, as these are related The ability with the type of exercises used in the training curriculum except that are hypoxic exercises, and these exercises as we know previously are exercises that lead to hypoxia, and therefore this ability is necessary to measure it from the researcher because of the evidence and physiological indicators that are closely related to the content of that study. And the non-oxygenic ability means the muscle's ability to work within the framework of the production of non-oxygenic energy that ranges from 30 seconds to two minutes with maximum intensity, and therefore this ability requires sufficient muscle capacity to withstand the lack of oxygen and increase the ability of those muscles to use anaerobic energy systems and withstand increased lactic acid, The non-oxygenic ability is the ability to maintain or repeat maximum muscle contractions depending on the production of non-oxygen energy with the lactic acid system and includes all activities that lead to the maximum possible muscle contractions with endurance of fatigue up to one or two minutes, and from these activities the effectiveness of running 400 meters3.

On the basis of these previous concepts about this ability, the researcher concludes that the exercises that she used, which are represented by the exercises of hypoxic, have increased the muscular adaptation and increased work of the working muscles, which gave evidence of the adaptation of the muscular system by increasing the density of capillaries of the working tissues.

In addition, the non-oxygen ability in the post test of the sample came in line with the development in bearing the speed that will be discussed later, and that this ability affects the mathematical level when using a load of more than 30 seconds, as distances were used close to that ability during The exercises, represented by a distance of 250 meters, 300 meters, 350 meters, are under study, with a maximum severity and incomplete rest4.

Table (3) shown The mean and standard deviation in the pre- and post-tests and the calculated and tabulated value of (T) in the pre- and post-tests of the sample set for the Speed Endurance Test (450 meters running)test.								
the test	Pre-Test		Post-Test		Calculated value of T	Table (T)	df	Significance
	A	Std	A	Std				

						value		
Speed Endurance Test (450 meters running)	70.24	3.491	59.71	2.147	7.815	1.83	9	Sign

This development in this test is first to the effectiveness of the training curriculum used and scientifically codified in terms of choosing the intensity of training, the size of training, and choosing the appropriate rest that is appropriate to the requirements of bearing speed, as the rated training loads have a significant impact in achieving a good level. The main means of causing the physiological effects of the body in order to achieve improving its responses and then adjusting the body's systems and raising the level, so it is considered one of the most important factors for the success of the training program and then improving performance5.

Secondly, to the effectiveness of the training intensity used, which effectively affected the development of speed tolerance, the intensity was 85-95%, which is very high and appropriate with the requirements of speed tolerance in order to make an impact. "The intensity that the player performs in exercise plays a large role in the physiological development of the functions of different body systems for the purpose of Achieving physiological adaptation, which will positively affect the achievement of digital achievement6.

Third, the appropriate rest used between exercises and this feature is one of the requirements for developing speed tolerance that the duration of rest be low with high intensity. This leads to a low amount of blood and oxygen as a compensation case in the rest period and there is an accumulation of lactic acid in the muscles, meaning that fatigue is still present. It makes there a physiological adaptation in the performance of muscles despite the presence of lactic acid and a decrease in the amount of oxygen and blood contained in the muscles that the trait of speed tolerance prepares the athlete for extreme effort and increase susceptibility to lack of oxygen7.

The effectiveness of the hypoxic exercises that were used is commensurate with the requirements for developing speed tolerance, as the essence of this type of basic training is the lack of oxygen, and the development of speed tolerance requires exercises represented by the lack of oxygen.

Hypoxic exercises should preferably be performed with speed training exercises. Which means "ability to resist fatigue with near-maximum to maximum load with a high degree of excitation mainly and anaerobic energy production"

Training without oxygen has positive reflexes from the body, as it increases hemoclopene in the blood to compensate for the lack of oxygen, and this is confirmed by physiological sources that state that "exercise without oxygen leads to an increase in hemoclopene in the blood, and this affects the heart, as it returns Heart and respiratory system to normal after three weeks of exercise

This is related to the nature of the adaptation that occurred from the hypoxic training and the need to continue using it in the period before the competitions to give the best results8.

IV. Conclusions and recommendations

Conclusion

Through the above presented results and the researcher's analysis and discussion of these results, he reached the following conclusions:

-The use of hypoxic exercises to develop in the respiratory system of aggressors by increasing the number of breaths, the rate of breath, and the depth of the breath that worked to show significant differences in the development of vital capacity in posttest tests.

-Hypoxic exercises contributed to raising the adequacy of the functional apparatus, such as: respiratory and muscular circuits on its performance in training in spite of the lack of the amount of oxygen contained in it. As a result, the results showed significant morale in developing the ability to bear speed and accomplishing the 400-meter run in the post-test.

-The use of respirators as a means of obstructing breathing by training has contributed successfully to the events of physiological changes in the body of the runners and the development of research tests.

-The use of the heart rate of 140 d / d during rest. An incomplete hospitalization method in which a lack of oxygen-saturated blood compensation for working muscles was successful in developing research tests.

- Using an oxymeter with training to measure and monitor blood saturation with oxygen is a very important method that contributes to the proper evaluation of the training curriculum.

Recommendations

Through what has been concluded, the researcher recommends the following recommendations:

- The need to use hypoxic exercises in training activities, events and games that are characterized by high intensity and continue for a long and relatively long period in which high hypoxia occurs, such as football halls, hand, boxing, squash, badminton and tennis.

- The necessity to use the masks and heart rate 140 zd / d during rest. Training means that impede the delivery of oxygenated blood to the muscles working in training in training curricula and other distance races.

- .Using an oxymeter to measure the percentage of oxygen saturation in the blood in the field during training and tests because it gives accurate results that help the trainer to know the intensity of training and the lack of oxygen, because the use of the oxymeter to measure the pulse gives more accurate results during training and enables the trainer to know the intensity through The pulse.

- The necessity of using the oximeter in knowing public health before starting the exercises, and using it to confirm from a functional point of view the body of players before specializing in events.

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