

The Effect of Special Endurance Exercises in Developing Some Functional and Biochemical Variables and Achieving 400 Freestyle Meters

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Abstract: The research intends to develop unique staying physical power games and discover their impact at the development of some useful and biochemical variables and to acquire 400 loose meters for the research sample, and the studies network consisted of college students of the second one degree in the college of physical schooling and sported Sciences / Basra college for the academic yr 2018-2019 of (173) college students disbursed over (6) divisions, a lottery became carried out on college students of the department (A) to decide (10) college students who constitute the research sample, and after homogenization of the sample contributors in terms of (height, weight, age), and after undertaking exploratory experiments, the principal test of the research changed into finished 10/2/2019 to 2/5/2019 for a length of (12) weeks, at a mean of (3) schooling units according to week. The researchers used the approach of high-intensity c program language period schooling, and the researchers used exceptional training distances (three hundred m, 2 hundred m, a hundred and fifty m) to increase the speed elongation for a running hobby (four hundred meters) is free. As for the interval among the repetitions and between the groups, the intermediate rest turned into through returning the heartbeat to (120 - one hundred thirty z / min) among the repetitions, and the relaxation between the corporations turned into by using returning the heartbeat to (110 - 120 z). / D) Then the recurrences of the magma start After treating the consequences of the pre and put up checks the use of suitable statistical way, the researchers concluded the subsequent: (1)The training curriculum has a clear effect on the development of the sample about the characteristic of special endurance, and the functional and biochemical variables, which led to an increase in the level of the sample and this development is reflected in the post-test in running 400 free meters. (2) The highest rate of development in lactic acid after exertion showed (58.35%) and the lowest rate of development in LDH after the effort was (1.76%).

Keywords: Special endurance, biochemical and freestyle

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Introduction

The carrying achievements which have been completed at present and the high degree of sports in widespread did now not come using a mere twist of fate or hypothesis, but rather the fruit of better planning for sports activities training, which relied especially on research, expertise and scientific experiments at an early date as the schooling system pursuits to achieve success for the sake of sports activities excellence. Research which might be involved with the useful and biochemical variables of the human frame has to turn out to be one of the maximum crucial sciences that studies and discuss the various physiological changes of the human body within the kingdom of relaxation and upon exerting physical effort, whether or not in the size laboratory or the stadiums and gyms. The improvement of measurement technology has brought about the improvement of methods of evaluating the physiological competence of athletes to perceive on the diverse useful and biochemical responses of the members and organs of the frame and the reactions of different sporting activities on the physiological and biochemical elements, in particular, that the functions of the human frame organs and their responses are continuously changing during the day, over the week and the month, whether in a country of relaxation or while exerting bodily effort, which calls us to learn about the various responses. To benefit from it while making plans sports schooling operations, as it's miles one of the essential pillars inside the development of sports activities achievements of numerous sports activities and activities, specifical athletics.¹

The 400m event is one of the athletics events, which require a degree of speed, endurance and strength, and special endurance in athletics, especially medium distances, is a determining factor for the level of achievement and in other activities a determining factor for the level of training. From the preceding, the importance of research is evident in the use of endurance exercises for the method of high-intensity interval training for the effectiveness of 400 meters, and knowledge of the functional and biochemical indicators that may occur as a result of training and through which achievement can be developed.

Research problem

The four hundred-meter freestyle pastime is certainly one of the fast strolling sports which are categorized from the activities which can be executed at much less than the most velocity. Due to the relative lengthy distance that can't be achieved at the most velocity, so the development of this activity calls for overlapping bodily and physiological requirements. one of the maximum vital bodily talents that this interest wishes, and physiologically, the extreme decrease in the quantity of oxygenating up and the buildup of the amount of lactic acid within the muscle tissue that generate fatigue that impedes the continuation of performance at excessive depth is the maximum crucial characteristic of this pastime. Consequently, the researchers determined to increase unique persistence sports which are characterized through high intensity and in which there is a loss of oxygen in an try and increase the performance of the functional equipment and the bodily talents of the runner and for this reason retain his performance with excessive intensity, resisting fatigue and lack of oxygen.

Research objectives

- Developing special endurance exercises and identifying their impact on the development of some functional and biochemical variables and achieving 400 free meters for the research sample.

Research hypotheses

- The presence of statistically significant differences between the results of the functional and biochemical tests and the achievement of 400 free meters before and after the research sample.

Research fields

- The human field: a sample of second-cycle students in the College of Physical Education and Sports Sciences / Basra University for the academic year 2018-2019.
- Temporal field: the period from 1/11/2018 to 7/5/2019.
- Spatial field: The field and field stadium of the College of Physical Education and the Sports Sciences / University of Basra.

Research Methodology

The nature of the problem to be studied in each topic determines the research methodology, and on this basis, the researchers adopted the experimental approach using the one-group design.

Research community and sample

The research community is determined by the second stage students of the College of Physical Education and Sports Sciences / Basra University for the academic year 2018-2019, and their number is (173) distributed among (6) divisions. The lottery was conducted on students of Division (A) to determine (10) students who represent the research sample Homogeneity was performed for the sample members in terms of (height, weight, age) and as shown in Table (1).

Table 1. Shows the moderation of the distribution of the research sample

S	Variables	Units	Mean	SD	Skewness
1	Age	Year	21.9	1.005	4.589
2	Length	Cm	174.4	4.718	2.705
3	weight	Kg	56	1.943	3.47

It is evident from Table (1) that all the values of the different coefficients in the variables (height, weight, and age) ranged between (2.705, 4.589). It is acceptable, as the value of the coefficient of variation is closer to (1), the homogeneity is high, and if it exceeds (30) means that the sample is not homogeneous.

Means of gathering information

- Personal interviews.
- Registration forms (recording measurements - recording tests).
- Tests and measurements.
- Statistical means.
- Arab and foreign sources.

Devices and tools used

- Electronic stopwatches (5), type (LTIS), made in China.
- Electronic height and weight measuring device.
- 50 regular blood keeping tubes.
- Electrophone meter (French made).
- Centrifuge.
- Manual device for measuring lactic acid The EDGE (British-made).
- Diagnostic kit (KIT) Kit (EDGE) British-made to measure the percentage of lactic acid concentration in the blood.
- Cooling box (COOLBOX).
- Medical syringes (60).
- Medical cotton and adhesive wounds.
- A pulse oximeter (watch) (1) Chinese-made wrists.
- Self-masking holder - HP laptop.
- Three drawers and markers.
- Whistle - measuring tape - adhesive - Class hand calculator - flat.

Tests and measurements used in research

Self-holding test ²

- The aim of the test: to measure the rate of breath-holding.
- Tools: stopwatch, nose catch, player seat.
- Test description: After the player sits on the chair, he takes a deep inhale, then puts the nose catcher and closes the mouth, indicating that the start of the stopwatch works and continues to hold his breath until he

announces the end of his prolonged ability by opening the mouth and the clock stops working, and the recording is measured by the second.

Margaria Cal's hypoxic ability test ³

- The purpose of the test: to measure the short oxygen capacity using the muscular capacity of the two men to skip a set of stairs.
- Age and gender level: The test is used for both sexes from (15 - 50) years old.
- Test description: The tester stands behind the starting line at a distance of (6) meters from the stairs. When the start signal is given, he runs at his full speed towards the stairs, trying to ascend it as quickly as possible so that he takes all three (steps) in one step, meaning that he ascends (stairs) The nine steps are taken in three steps, starting with the third degree, then the sixth and then the ninth, where the height of one step in it is 17.5 cm. When the laboratory puts its foot on the third step, the stopwatch starts to work to measure the time. When the laboratory's foot reaches the ninth degree, the clock stops and then records the time Which laboratory has travelled to the nearest (0.01) second.
- Method of calculating results: The short oxygen capacity is extracted through the following equation:

$$\text{Anoxic capacity} = \text{weight of the player} * 9.8 * \frac{\text{the vertical distance between the positions of the clock key/time of the distance travelled.}}{\text{the distance travelled.}}$$

Measuring the percentage of lactic acid concentration in the blood

- The aim of the measurement: To know the percentage of lactic acid concentration in the blood before and after exertion.
- Tools used: Lactic Acid Meter (THE EDGE) - Blood drop checker - KIT tape measure.
- Measurement method: operating the device, after operating the tape measure (KIT) is placed at the location designated for it in the device, after placing the tape a sign appears to indicate the placement of the blood drop, then the blood drop is placed by using a hook to pick one of the fingers of the hand after pressing One of the fingers so that we can eject a drop of blood, we notice through the screen of the device after (45) seconds after placing the drop of blood, the appearance of the percentage of lactic acid in the blood.
- Recording: This is done by placing a drop of blood from one of the fingers of the hand that was pricked by a device of suspects to obtain a drop of blood and placing it in the measuring tape (KIT) placed in the device, and these kits to show the percentage of lactic acid concentration in the blood and by using the device and according to the rates mentioned in the attached instructions With the Kit, in recent years, modern and simple devices that can be carried by hand have been used to measure the percentage of lactic acid in the blood after the implementation of physical effort to find out the movement of the increase in the amount of lactate in the blood and its decrease after the physical effort, to ensure the transfer of the largest proportion of lactic acid from the muscles into the blood. It is used in most physiological research and

experiments, and a percentage of it is placed in the device that measures the percentage of acid, and after (45) seconds the number that appears on the screen is read and recorded in the form.

Measurement of (LDH) enzyme before and after exertion⁴

A blood sample was taken from the sample members on Thursday 20/12/2018 at nine o'clock in the morning in the stadium of the College of Physical Education and Sports Sciences - the University of Basra, at a rate of (10 h) at the time of rest before and after the effort, as samples are taken from the upper arm area of venous blood and this What has been confirmed by scientific sources (1), as blood samples are placed in blood preservation tubes that contain an anti-clotting substance ETDA according to the name of the laboratory before and after the effort, and then after that, they are separated in a centrifuge to extract (serum and blood plasma) from each tube with the help of chemical A specialist in this field and then placed in tubes written on it the name of the laboratory before the effort or after the effort, as well as the type of analysis and kept in the cool box (COOLBOX) to be transported to the laboratory.

Examining the achievement of the 400-meter freestyle sprint

- Objective: To measure the achievement of 400 m free running.
- Tools used: playground and square, electronic stopwatches, registration form.
- Performance description: The sample was tested to find out their maximum, the test begins according to what follows (when the tester hears the command (Take your place), it begins to take a sitting position behind the starting line, and upon hearing the phrase (get ready), the tester takes the ready position for the beginning of the run, and when they start signals are heard Or departure, the laboratory starts running a distance (400 meters) and after completing the distance, the time spent by each laboratory is recorded in its registration form, and here the principle of competition between the testers was taken into account.

Exploratory experiments

The first exploratory experience

The researchers conducted the first exploratory experiment on Sunday 25/11/2018 on (5) students who did not represent the research sample and under the eyes of the research sample by applying the tests used. LDH) before exertion at rest and after exertion, as well as lactic acid in a sequential manner, as for the second day, rest, and on Tuesday 27/11/2018, the researchers conducted a self-suppression test and a short oxygen capacity test, and the purpose of the experiment was the following: To demonstrate the suitability of the tests for the research sample - Ensuring the validity of the devices and tools used in the research - Increasing the knowledge of the medical staff and assisting in performing the tests - Identifying the difficulties and problems that researchers may face during the main experiment - Knowing the time required to conduct pre-tests.

The second exploratory experience of the exercises

The researchers conducted the second exploratory experiment on Sunday 12/12/2018 until Tuesday 4/12/2018 on the original research sample by applying the exercises used in the training curriculum. The purpose of the experiment was: to codify the exercises used and the suitability of the physical load (intensity and size And rest) and to know the extent of the sample's ability to perform the exercises used in the research and to know the times needed for exercise and rest.

Field research procedures

Pre-tests

The researchers conducted the pre-tests for the research sample in the period (20-22 / 12/2018) on the playground of the College of Physical Education and Sports Sciences at nine in the morning according to the following order:

- On Sunday morning, 12/20/2018:
- Achievement test for running (400) meters, as well as conducting biochemical tests for the enzyme (LDH) before exertion at rest time and after exertion as well as lactic acid.
- Tuesday morning, 12/22/2018.
- The researchers conducted a self-suppression test and a short hypoxic ability test.

The main experience

The researchers prepared a special training curriculum to develop the velocity elongation for the effectiveness of running (400 meters) freestyle for the selected sample. The duration of implementing the training curriculum took (12) weeks of (3) training units per week, and the number of training units reached (36) Unit that was implemented from 10/2/2019 to 2/5/2019. The researchers used the method of high-intensity interval training, as well as that the principle of gradation in the intensity of training was used for the length of the training period. The researchers used different training distances (300 m, 200 m, 150 m) to develop the velocity elongation for the effectiveness of running (400 meters) free. Regarding the interval of rest between the repetitions and between the groups, the interstitial rest was by returning the pulse to (120 - 130 z / d) between the repeats, and the rest between the groups, so it was with the return of the pulse to (110 - 120 z / min) and then began to perform the repetitions of the next group.

Post-tests

The researchers conducted the post-tests for the research sample from 5-7 / 5/2019 on the playground of the College of Physical Education and Sports Sciences / University of Basra, using the same pre-tests and in the same order and conditions with the pre-tests.

Statistical means

To process the data obtained by the researchers, they used the following statistical methods:

- Mean.
- Standard deviation.
- Coefficient of variation.
- T-test for cross-linked samples.
- The law of percentage of evolution.
- The data were processed by a computer using the statistical software SPSS Ver 23.

Results

Table 2. Shows the mean, standard deviation, standard error of differences, the calculated (t) value, the probability value of the functional and biochemical tests, and the pre and post achievement of the research sample

Variables		Units	Pretest		Posttest		Std. Error Mean	(t) value	Sig. (2-tailed)
			Mean	Std. Deviation	Mean	Std. Deviation			
Self-suppression		Sec.	78.200	16.949	101.400	17.308	0.997	23.252	0.000
The hypoxic capacity		Sec.	0.607	0.030	0.454	0.030	0.007	20.929	0.000
Lactic acid	Before the effort	Milligrams	41.300	9.580	26.100	9.158	2.269	6.697	0.000
	After the effort		127.700	16.282	306.600	65.939	4.263	5.699	0.000
LDH enzyme	Before the effort	Unit / liter	306.600	65.939	312.100	30.366	14.197	0.387	0.707
	After the effort		327.800	74.289	414.000	38.533	18.112	4.759	0.001
Achievement		Sec.	69.100	0.875	61.900	1.911	0.533	13.500	0.000

The results presented in Table (2) show that the values of (t) Paired Samples Test in (breath mute, anoxic capacity, lactic acid before and after exertion, LDH enzyme after effort, achievement) were respectively (23.252, 20.929, 6.697, 5.699, 4.759, 13.500). It also appeared that the attached P-value is smaller than the significance level (0.05), indicating that there are significant differences between the results of these pre and post-tests in favour of the post-tests. At the same time, the value of (t) is the Paired Samples Test in the LDH enzyme before Effort (0.387) It also

appeared that the attached P-value is greater than the level of significance (0.05), which indicates that there are no significant differences between the results of testing this pre and post variable.

Table 3. Shows the development ratios between functional, biochemical and achievement tests (pre and post) for the research sample

Variables		Units	Pre mean	The post mean	Evolution ratios
Self-suppression		Sec.	78.200	101.400	22.880
The hypoxic capacity		Sec.	0.607	0.454	25.206
Lactic acid	Before the effort	Milligrams	41.300	26.100	36.804
	After the effort		127.700	306.600	58.350
LDH enzyme	Before the effort	Unit / liter	306.600	312.100	1.762
	After the effort		327.800	414.000	20.821
Achievement		Sec.	69.100	61.900	10.420

Discussions

By reviewing the tables (2 and 3) of the functional, biochemical and achievement variables between the pre and post-tests of the research sample, it is evident that the post-tests have improved on the pre-sample. The researchers attribute this result to the proposed exercises that were applied to the research sample that had a clear impact on the development of velocity and the rest of the variables and achievement. Because it was based on the scientific foundations in the formulation of its vocabulary "as the regular and programmed training and the use of the types of regulated intensity in training and the use of the types of optimal rest between the repetitions lead to the development of achievement".⁵

Through the previous tables, we note that there are significant differences between the pre and post-tests and in favour of the posttest, whether the levels of lactic acid concentration in the blood before and after the effort. "When designing exercises with the lactic acid system, it should be noted that the maximum intensity of the formation of lactic acid It occurs after (15 - 45) seconds from the start of high-intensity muscular work, and it turns out that a normal, non-athletic individual can continue to perform for up to two minutes, and when the goal is to develop lactic endurance capacity, the performance time continues (2-4) minutes to (5-7) (Minutes),⁶ and the clarity of the exercises and the ease of their implementation gave some comfort to the practitioners in performing them correctly, which led to the absence of problems in the training process. Speed is one of the most important basic elements required in training a (400) meter run. The distances used in this element range from (100-600) meters in order to

maintain the required intensity in training and on the other hand, this type of training is designed to help improve an energy system Lactic acid ,⁷ as for the decrease in lactic acid before physical exertion between the two measurements before and after, it is an expressive sign of the efficiency of the body to get rid of the acid by breaking it and removing it with the urine or re-using it through the reverse action of the enzyme (LDH), which converts it into Pyruvic and then to glucose, and it can also be used in certain rates as a source of energy in the heart muscle, and its height after physical exertion is a natural matter because the activity of an enzyme (400 meters) falls within the glycolytic system, and the more the body stores glucose and the intensity and time of performance increase, we can notice The natural increase in acid elevation, however, remains within the normal limits that do not affect the functioning of the functional organs.⁸

Through what was shown of the levels of the enzyme concentration (LDH) before and after the effort in the pre and post-tests of the research sample, which showed differences between the enzyme concentration ratios in the post-tests, whether before or after the effort, confirms that sports training affects the work of the enzyme because the opinions Conflict over the effect of training on the work of the enzyme, some opinions support the idea of non-effect, others support the idea of influence. The researchers agree with the idea of the effect of training on enzyme activity, depending on the results they reached during the research. Believe that the enzyme lactic dehydrogenase LDH helps in converting pyruvic to lactic acid. -LDH) forms lactic from pyruvic, while the heart enzyme (H-LDH) regulates the reverse reaction, i.e. converting lactic to pyruvic, and this enzyme has no specific evidence on the effect of training on this enzyme, as some studies recorded a decrease in the activity of this enzyme. In contrast, they recorded Other studies have changed.⁹ The researchers attribute the development in the results of the biochemical tests for the enzyme (LDH) and the increase in the concentration of the enzyme activity after the effort due to the training loads that were carried out during the period of implementing the training program. "It has become certain. Sports training create physiological and chemical adaptive changes in many structural and representative components of cells and muscle fibres, and among these changes that can be recorded inside cells and fibres before, during and after physical exertion are the changes that occur. It happened to the enzymes, as it is one of the most chemical changes associated with the training process and the most affecting the ability of the athlete. One of these enzymes is the enzyme (LDH)). Specialist as a result of the increased breakdown of the glycogen bonds to obtain energy during the maximum anoxic action ",¹⁰ yet the level of LDH concentration remains within normal limits.

Conclusions

1. The training curriculum has a clear effect on the development of the sample, and this is what the results of the 400-meter Free Post-test showed.
2. The training curriculum has a clear effect on the development of the sample concerning the characteristic of special endurance, and the functional and biochemical variables, which led to an increase in the level of the sample and this development is reflected in the post-test in the sprint of 400 meters free.
3. The highest rate of development in lactic acid after exertion was (58.35%) and the lowest rate of development in LDH after the effort was (1.76%).

Recommendations

1. When conducting the special speed endurance characteristic training, it must be emphasized to increase the number of iterations with an increase in the intensity of the load, which must be consistent with the size of the training or iterations, where the intensity is between the least and the maximum and reaches the maximum, i.e. from 75% -90% or From 90% -100% of maximum capacity which contributes to the result to developing speed endurance.
2. Using such a training curriculum gradually on a sample of students is good because we obtained significant results in the post-test.
3. Conducting laboratory tests (functional and biochemical) during training to monitor the effects of training on the athlete's body systems and then ensure that the required adaptation takes place.

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