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"Effect of exercises according to the fatigue index to improving energy conservation, rapid fatigue, endurance of special speed and achievement for 200m runners under 20 years"

Asst. Prof. Dr. Alaa Flayyih Jawad
Iraq - University of Kerbala - College of Physical Education and Sports Sciences
alaa.flaih@uokerbala.edu.iq

Abstract

One of the most important goals of sports training is to prepare the athletes physically to achieve the best achievement in the specialized event through the use of appropriate and ideal training methods and methods that are compatible with its energy system to improve its requirements, and the effectiveness of running (200 m) is one of the events that requires extreme training and one of its most important requirements is to improve (Energy conservation variables, rapid fatigue and endurance of special speed) so that runners can run at maximum speeds and endure these speeds for the longest possible period of time despite the appearance and accumulation of the concentration of lactic acid (LA) in the blood and muscles as a result of the maximum effort exerted by the runners during training or competition to achieve the best achievement athlete, therefore, the researcher turned to studying these variables by using exercises with the fatigue index and identifying their effect, as well as identifying the preference of these exercises over the exercises adopted by trainers in improving the variables under study, the researcher used the experimental method in the manner of the two equal experimental and control groups, and he chose his research sample from the Karbala governorate clubs by the comprehensive inventory method. One of the most important research procedures was to determine exercises according to the fatigue index for various distances, and to determine the tests for energy conservation variables, rapid fatigue, and endurance of special speed, the researcher used the appropriate parametric statistical methods for the work, namely (arithmetic mean, standard deviation, Levin's law to find homogeneity, and (t) law for symmetrical and independent equal samples to find equivalence between the two groups, as well as finding differences between the tribal and remote tests and between the post-tests between the experimental and control groups). Among the

most important conclusions, exercises according to the fatigue index contributed to improving the variables of energy conservation, rapid fatigue, endurance of special speed and achievement, with the preference of these exercises over the exercises used by trainers. The most important recommendations are the adoption of exercises according to the fatigue index in improving the variables under study and the necessity of paying attention to them by the trainers and those concerned with the specialization, and applying these exercises to other activities and to different age groups.

Keywords : fatigue index, energy conservation, special speed.

1. Introduction

Athletics is one of the individual sports that has been covered by scientific progress and rapidly from year to year, and it appears more clearly in the current numbers. As well as breaking world records, and access to these achievements can only come by using the best scientific methods in order to obtain an advanced digital level in these events, and the nature of the training curriculum for athletics in its goals is more physical than it is in the skill side. This is due to the element of mathematical achievement, which is determined by time, distance, or height, and the event of the (200m) sprint is one of the athletics events that are characterized by intense competition between runners, as it deals with maximum effort and concentration from the first moment of starting until reaching the finish line. This effectiveness depends in its performance on the maximum capabilities of the runner and on the production of energy in the anaerobic system (phosphine and lactic), and the great burden is on the nervous and muscular systems during effort and during rest periods, whether in training or competition. In addition to the fact that its achievement is resolved in fractions of a second, so dealing with it has become very difficult and the coaches must use the best training methods and methods to achieve the best levels, in all sports exercises, there is energy used to carry out physical effort in the human body, and this energy is vital energy that is transformed into mechanical energy necessary to perform that effort, and the energy sources in physical effort are a chemical source (adenosine triphosphate and phosphate globules) and a food source (carbohydrates and fats). And this energy is the direct source that the muscle uses to perform a specific muscular work. After a period of continuing to perform any sports activity, no matter how intense, the athlete is exposed to a temporary and gradual decrease in the level of performance adequacy, and this is called fatigue. Muscular fatigue is one of the most important problems that athletes face in all sports, as it is the main obstacle in physical, skill and schematic performance. Fatigue has an effect on the nervous system, as the player's ability to respond quickly is reduced. In terms of its effect on the muscle, it is represented in its inability to contract muscle with the same strength as usual. When the muscles perform a large number of single or continuous contractions for a period of time, a clear decrease in their ability to contract has been observed. late to respond. The goal of sports training is to accustom the athlete to face fatigue in order to improve his adequacy and overcome the conditions of competition. Therefore, the work of the coaches should focus on rationing the training load in an effective manner, with the level of the athlete's performance to the point of fatigue, and by repeating the training load at a specific

time during the recovery period, allowing the success of the functional adaptation process. And the level develops. Otherwise, fatigue will accumulate with the continuation of training and the emergence of a state of stress, and thus stop and decrease or deteriorate the level. One of the most basic physical requirements is the speed endurance component of the effectiveness, which plays an important role in its achievement. As most scientific sources indicate that it is the decisive factor in achieving victory in the race, so runners have to work hard to reach the highest level in this physical ability, and runners must have a high index of energy conservation, in addition to that, the index of rapid fatigue they have low levels because this indicates their high sufficiency in bearing the fatigue resulting from performance, whether in training or competition. The fulfillment of these two conditions will make the runners have a good amount of the speed endurance component of the effectiveness and thus improve the achievement or the level. Hence the importance of the research in preparing exercises with the fatigue index and including them within the training curriculum of the runners to obtain satisfactory results in the variables studied to reach the runners to the best athletic levels.

Research problem :

Through the follow-up and field experience of the researcher, he noticed that the level of achievement for the event (200m) does not meet the ambition, and that the Iraqi record for this event is far from the Arab, Asian and international digital standard. Therefore, the researcher sought to find solutions to address this decline or difference in sports levels. In addition, the identification and measurement of modern variables that were not used by coaches in evaluating the athletic levels of runners, in order to advance the digital level of runners, so the researcher deliberately studied and used the fatigue indicator in the training process and with maximum stress, and measuring the indicators of energy conservation, rapid fatigue, and endurance of speed for effectiveness, in the hope that you contribute or treat even a small part of this decline in the service of the sports movement in our dear country, and add some theoretical and practical information for coaches.

Research objectives:

- Preparing exercises according to the fatigue index to improving energy conservation, rapid fatigue, endurance of special speed and achievement for runners (200 m) under (20) years.
- Identifying the effect of exercises according to the fatigue index to improving energy conservation, rapid fatigue, endurance of special speed and achievement for runners (200m) under (20) years.
- Identifying the superiority of the effect between exercises (control and experimental group) to improving energy conservation, rapid fatigue, endurance of special speed and achievement for runners (200m) under (20) years.

Research hypothesis:

- Exercising according to the fatigue index has a positive effect to improving energy conservation, rapid fatigue, endurance of special speed and achievement for runners (200m).

- The preference of the experimental group over the control group in the effect of improving energy conservation, rapid fatigue, endurance of special speed and achievement for a runner (200m).

Research fields:

The human field: The 200m youth runners in the holy Kerbala governorate clubs for the 2020-2021 sports season..

Time field: from 6-4-2021 to 5-8-2021.

Spatial field: Youth Sports Stadium in Kerbala .

Research methodology and field procedures:

Research Methodology:

The researcher used the experimental method by designing the two equal experimental and control groups to suit the nature of the problem and the research objectives and hypotheses.

Community and sample research:

The research community was selected from the runners of the holy Karbala governorate clubs for the youth category for the effectiveness of an enemy (200 m) and they numbered (10 runners), and the researcher chose his research sample by a comprehensive inventory method at a percentage of (100%), and then divided the research sample in a simple random way into the two groups (control and experimental) Each group has five runners. The researcher made measurements for the variables (height, mass, and training age), and performed the process of homogeneity on the members of the research sample using the statistical law (Levine) in these measurements because of their impact on the studied research variables and isolate this effect, and proved that the members of the research sample are homogeneous in these variables The moral level of the (Levine) test was (0.102, 0.582, and 0.740) respectively, which is greater than the level of significance (0.05), which indicates the homogeneity of the research sample members.

Means, devices and tools used in the research:

The researcher used the following means, devices and tools:-

Observation, test and measurement, personal interview, electronic hand-held calculator (SHARP), computer (Pentium 4) of Korean origin, 3 manual stopwatches (Kislo 610) of Chinese origin, weighing device (Korean origin), legal track For athletics, different tools (red and white flags, starting cubes, shooting pistol).

Field research procedures

Determining the exercises according to the fatigue index:

The researcher prepared exercises according to the fatigue index at different distances by means of equations that are entered into the Excel program, taking into account the athlete's mass at work (11, 44). The method of calculation is by entering the athlete's mass (kg) and the times of the specified distances with six repetitions in an equation within the Excel program as shown in Figure (1).

		Kg	60	Athlete's mass	
		Capacity	Time	Running	
	Watt	790.7	4.53	Time 1	
	Watt	745.4	4.62	Time 2	
	Watt	685.8	4.75	Time 3	
	Watt	617.2	4.92	Time 4	
	Watt	538.1	5.15	Time 5	
	Watt	502.2	5.27	Time 6	
Watt	502.2	Less capacity	Watt	790.7	Max capacity
Watts/sec	9.866	Fatigue index	Watt	646.5	Average capacity

Figure: (1) Explains how to enter data in the RAST test

Determining tests and measuring research variables:

After the researcher reviewed the sources, references, theses and scientific thesis, a test (30 m repetition) was chosen to measure energy conservation and rapid fatigue, a test (150 m) to measure special speed endurance.

Description of the tests for the research variables:

First: Test (repetition 30m)

Objective of the test: To measure energy conservation and rapid fatigue.

Test requirements: legal track for athletics, 12 cones, stopwatch, assistant, registration form - recorder - timer - absolute.

Test description:

The runner warms up for 10 minutes, the assistant prepares the course according to the diagram Figure (2) using cones, the runner stands at the starting line at point (A), then the assistant gives the order to start the test, so the timer sets the timing, the runner runs at the maximum speed from the point (A) to (B) between the cones with a deviation (5 meters) aside in the middle of the race, and when the runner crosses the distance (30 m) specified by point (B) in the upper part, the timer stops the clock and records the time, the runner slowly returns to point (A) (And it should not take this (30 seconds) following the path on the diagram, the runner has to make (10 repetitions) rest between them (30 seconds).

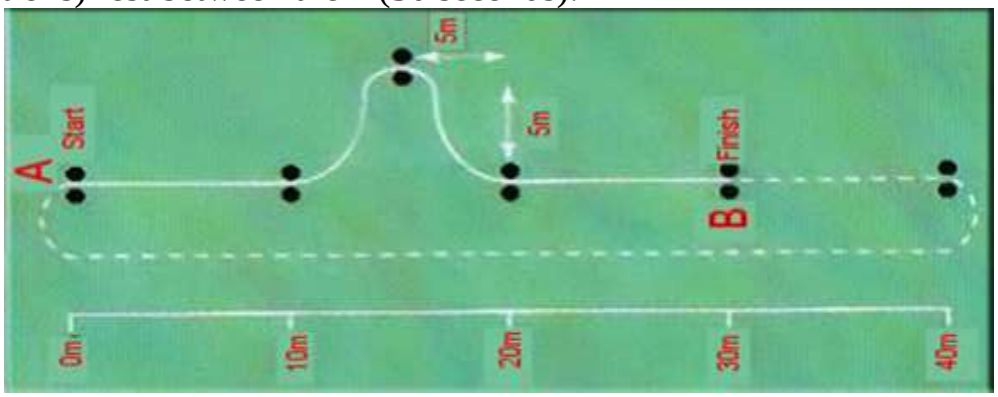

Figure: (1) Demonstrates a test (30m repetition) to measure energy conservation and rapid fatigue

Register :

The energy conservation index is calculated by extracting the average speed for the first three iterations and dividing it by the average speed for the last three iterations, and the evaluation is according to the following table:

Table (1) Shows the rating of the energy conservation variable.

Less average	Average	Above average	Will	Evaluation
<0.799	0.80 to 0.849	0.85 to 0.899	> = 0.9	Strength point

Fast fatigue (sprint fatigue) is calculated by subtracting the fastest time for a distance (30 m) from the slowest time for a distance of (30 m).

Second: A test of running 150 meters from a high start

Objective of the test: To measure your speed tolerance.

Test requirements: legal athletics track, stopwatches, assistants, registration form, starter, timers, whistle.

Description of the test: The runner stands behind the starting line at the 150 m line, which is the middle of the second arc. The start is from a high standing position. When the start signal (a whistle from the absolute referee) is heard, the runner runs to cross the test distance of (150 m) as quickly as possible and when reaching the finish line the stopwatches are stopped by the timer.

Register: The time is calculated to the nearest (1/100) of a second for each runner and is placed in the test form by the assistant work team.

Third: Running test (200m):

The purpose of the test: to measure achievement.

Test requirements: A legal track for athletics, 6 stopwatches, shooter, 6 timers, recorder, firing pistol, 6 starter stands, special forms for recording measurements.

Description of the test:- The test begins with each tester (runner) taking his place after hearing the word “take your place” by the referee by sitting behind the starting line and according to the set space for him. , {that is, the front and back support are placed close to each other}, and when the divorced person mentions the word “Be Ready”, the runner raises his hips high so that its height is slightly higher than the height of the shoulders and the knees are slightly bent, while the center of gravity of the runner leans slightly forward towards the arms. The arms are straight and the elbows are closed. The tester remains in this position until the permission to start (the firing pistol) is heard, then the runner runs as quickly as possible.

Register: The achievement of an enemy distance (200 m) is calculated to the nearest 1/100th of a second.

Pre-test:

Before starting the implementation of the exercises prepared in the training program, the researcher conducted tribal tests for the members of the research sample, which numbered (10 runners), divided into two control and experimental groups, in order to establish the degree of tests and to identify the level of runners when performing the exercises prepared in the training program.1/5/2021 at six o'clock in the afternoon at Al Shabab Sports Stadium in Kerbala Governorate

Equivalence Procedures:

After completing the application of the tribal tests for the variables under study and the achievement of a sprint (200 m), the researcher conducted the equivalence between the control and experimental groups using the parameter statistical law (T) for two independent samples equal in number with the results of measurements and tribal tests, for the variables (conservation of energy, rapid fatigue, endurance of speed and achievement) , and the results proved that the two groups were equal, and

the levels of significance were, respectively (0.199, 0.202, 0.266, 0.429) which is greater than the level of significance (0.05), which indicates the equivalence of the members of the two research groups.

Main experiment:

The researcher worked to preparing exercises to be included within the training program to develop research variables (under study) for the experimental group, relying on the analysis and review of a large number of specialized scientific sources and references, as well as the researcher's experience gained through his practice of athletics as well as from his studies. The exercises were characterized by the following: -

- The exercises were carried out in the special preparation stage, and they were started on Saturday (8/5/2021) for a period of (10 weeks) and our unit had two training units per week and a total of (20 training units). The researcher took into account the training for the rest of the days of the week to be as equal as possible for all members of the research sample in terms of the components of the training load and the objectives of the training unit. The implementation of the exercises prepared in the training program ended on Tuesday (13/7/2015).

Post-test:

After completing the implementation of the vocabulary of the training program, the researcher worked on pre-applying the tests that were conducted in the pre- test (before the experiment) on Saturday (17/7/2021), and in the same time, place and steps for the tribal tests of the variables (under study) as much as possible.

Statistical means:

The researcher chose the statistical means related to comparing the results of the pre and post-tests, and he used the spss . statistical package system.

Presentation, analysis and discussion of the results:

Presentation and analysis of the results of the pre and post-tests of the research variables for the control group.

Table (2) shows the values of the arithmetic mean, standard deviation, mean of differences, standard error of differences, the calculated T value, the level of significance, and the type of statistical significance for the pre and post-tests of the research variables for the control group.

Variables	Test	Mean	Std.	Differences Mean	Differences Std.	T calculated value	Sig value	Sig type
Energy conservation	Pre-test	.8368	.01301	-.01120-	.00102	10.983-	.000	Sig
	Post-test	.8480	.01304					
Rapid fatigue	Pre-test	.9260	.09762	.05000	.00837	5.976	.004	Sig
	Post-test	.8760	.08444					
speed Endurance	Pre-test	16.8400	.33615	.17000	.05385	3.157	.034	Sig
	Post-test	16.6700	.21679					
Achievement	Pre-test	22.8800	.38987	.21000	.06403	3.280	.031	Sig
	Post-test	22.6700	.26833					

Presentation and analysis of the results of the pre and post-tests of the research variables for the experimental group.

Table (3) shows the values of the arithmetic mean, standard deviation, mean of differences, standard error of differences, the calculated T value, the level of significance, and the type of statistical significance for the pre and post-tests of the research variables for the experimental group.

Variables	Test	Mean	Std.	Differences Mean	Differences Std.	T calculated value	Sig value	Sig type
Energy conservation	Pre-test	.8246	.01452	-.05940-	.01294	-4.592-	.010	Sig
	Post-test	.8840	.01817					
Rapid fatigue	Pre-test	1.0460	.16682	.27600	.07814	3.532	.024	Sig
	Post-test	.7700	.02121					
speed Endurance	Pre-test	17.0400	.16355	.64000	.06782	9.436	.001	Sig
	Post-test	16.4000	.06124					
Achievement	Pre-test	23.0600	.28592	.71600	.12086	5.924	.004	Sig
	Post-test	22.3440	.03782					

Tables (2,3) shows the statistical indicators of the results of the pre and post tests for the research variables that the members of the control and experimental groups were subjected to. The results showed that the arithmetic mean value of the energy conservation variable was greater in the post test than the pre-test, there was a significant change between the two tests in favor of the post test, and the results also showed that the arithmetic mean values of the variables of rapid fatigue and endurance of special speed and achievement were lower in the post test than the pre-test, there was a significant change between the two tests and in favor of the post-test , since these variables have inverse value, that is, the lower the arithmetic mean, the better the level, because it deals with the time factor of measurement, and this was indicated by the levels of significance through the use of the statistical law (T) for the interconnected samples as it was for all The variables are less than the significance level (0.05), which indicates that there are significant differences between the two tests.

Discussing the results of the pre and post-tests of the research variables for the control and experimental groups:

By presentation and analyzing the results in Table (2) of the pre and post-tests of the research variables under study for the members of the control group, it was found that there are differences between the pre and post-test and in favor of the post test, the researcher attributes these differences to the continuation of the members of the control group in the process of daily sports training, which was characterized by the good organization of the components of the sports training load and taking into account the individual differences between the runners of this competition, which contributed to showing the differences between the members of this group. organized according to a program prepared on scientific bases that leads to the development of various physical characteristics . In addition, the training program for the members of this group was aimed and focused on the special abilities that have a close and strong relationship with the requirements of effectiveness and that contribute significantly to improving their athletic achievement, and this was confirmed by (Adel Turki) “that

the group of exercises or physical efforts that are used in training units It leads to an adaptation or functional change in the internal organs and organs of the body to achieve a high level of athletic achievement [(1)] . Hussain Ali Al-Ali and Amer Fakher Shaghati also point out that "the daily exercises are nothing but (exercises for the purpose of achieving the goal of training, and that is through the implementation of specific methods and methods, as well as the means used when implementing the training program during the different preparation phase and directed to raise the level of athletic achievement, As well as setting and organizing the form of training according to the objective set or to be achieved" [(2)] . This confirms the improvement of the members of the control group in these variables, which are among the basic abilities that short-distance runners need in high performance to achieve the best achievement. As for the members of the experimental group, a significant development occurred between the two tests and in favor of the post test. When we want to develop or improve a variable, we must take into account the degree to which training and exercises are related to the nature and specificity of this variable, and to what extent it can affect it based on the opinions of specialists in the relevant field as well as relying on scientific sources. The variables of energy conservation and rapid fatigue are among the variables that are often accurate and very sensitive, whether through the method of measuring and determining them, or through the methods and methods of developing them, in addition to the lack of studies that have dealt with them. With regard to the indicator of energy conservation, we see that the maximum effort dimension was greater in the post test than in the pre-test, and this is evidence of the physical and functional strength of the runners, which contributed to the performance of the exercises with high efficiency in the training unit, which enabled them to bring out the maximum stress better than it in the test this improved the time traveled by the runners in the training distances, and this reflected positively on their achievement. This was confirmed by (Jabbar Rahima Al-Kaabi) "The energy consumed during sports training depends on the intensity and duration of the training load, the higher the intensity of the training load and the longer its duration, the greater the amount of energy consumed" [(3)] . As for the indicator of rapid fatigue resulting from physical performance, as it is known, during training or competition, the runner is exposed to fatigue, so coaches must try to reduce its negative impact. physical, here comes the role of the coach in working to delay the onset of fatigue as long as possible so that the athlete can continue to perform with better effectiveness, and (Mahdi Kazem Al-Sudani and others) refer to "the main cause of fatigue is the accumulation of lactic acid in the muscles and in the blood and its negative impact on the nervous system" [(4)] . This is what was achieved in the exercises of the experimental group, which focused in their training on the training according to the fatigue index under the scale (10), which gave the runners adaptations that enabled them to be late signs of fatigue, if true, and this is what was shown by the results of Table (3), where the fatigue index was Less in the post-test than the pre-test (the difference between the last and the first repetition), and this indicates that the level at the beginning of the effort was close to the level at the end of the effort, and this will contribute to improving the level of the runners, whether in training or competition, and this is what they set out in the training process, as for the specific velocity

endurance variable, the researcher attributes the reason for this development to the exercises that were used in the training program and which were applied over a period of ten weeks for the members of the experimental group, in which the researcher took into account the gradation of the distances used from the shortest to the longest, and these exercises were represented by the repetition of fewer distances From race distances and maximum intensity, This is what Jamal Sabri Farag points out: "The use of short distances by runners with relatively short rest periods prepares them better for the demands of their sports, and because they have learned the complete acceleration mechanism and developed the skill of maintaining high speed, they will be able to work faster and for a longer distance and at the same time despite fatigue, And if they do not perform this gradual in this way, as soon as they get tired (in training or competition) they will suffer from a mechanical and technical stopping point and they will have to stop training" (5) . This is consistent with what was stated by (Mohammed Reda Ibrahim) "It is possible to improve the speed endurance of the sprint activities in the athletics organized on this system (the phosphagen energy system) by repeating the repetitions of a short distance sprint with a maximum intensity for the runner and preferably using the repetitive training method, and emphasizes when training Special Speed It is necessary to use the maximum intensity and increase the distances of the sprint used in training the maximum speed gradually and within the time period of this system" (6) . The distances that the researcher used in the special speed endurance training contributed significantly to maintaining the average speed of the runner after sprinting at the maximum speed, and this gave the runner the ability to run at the highest possible speed at this stage within the time period of this system, as for the achievement variable. The researcher attributes the reason for the development to the researcher's use of the exercises that were included in the training program for the runners of the experimental group, in which he employed exercises to improve variables related to the achievement of the effectiveness of the sprint (200 m) (conserving energy, rapid fatigue, endurance of special speed), which were prepared in a scientifically accurate manner that led to the occurrence of a positive effect of these variables related to the sprint (200 m) and thus improve the achievement, the use of these exercises with extreme stress led to an improvement in the efficiency of the work of the central nervous system on the rapid transition between excitation processes and operations of the palm, as well as contributed to improving the level of neuromuscular compatibility between different muscle fibers and different muscle groups, and increasing the rate and activation of motor units working more quickly, and this played a major role in the improvement process.

Presentation and analysis of the results of the post-tests of the research variables between the control and experimental groups and their discussion.

Table (4) shows the values of the arithmetic mean, standard deviation, the calculated (T) value, the level of morale, and the type of statistical significance for the post-tests of the research variables for the control and experimental groups.

Variables	Group	Mean	Std. deviation	T calculated value	Sig value	Sig type
Energy conservation	Control	.8480	.01304	-3.600-	.007	Sig
	Experimental	.8840	.01817			
Rapid fatigue	Control	.8760	.08444	2.722	.026	Sig
	Experimental	.7700	.02121			
speed Endurance	Control	16.6700	.21679	2.680	.028	Sig
	Experimental	16.4000	.06124			
Achievement	Control	22.6700	.26833	2.690	.027	Sig
	Experimental	22.3440	.03782			

Table (4) shows the statistical indicators of the results of the post tests of the research variables that the members of the control and experimental groups were subjected to. The results showed that the arithmetic mean value of the energy conservation variable was greater in the post test of the experimental group than the control group, and a significant change occurred between the two groups and in favor of the experimental group. The results also showed that the arithmetic mean values of the variables of rapid fatigue and endurance of special speed and achievement were lower in the post-test of the experimental group than the control group, and there was a significant change between the two tests in favor of the post-test because these variables have inverse value, meaning the lower the arithmetic mean, the better the level, because It deals with the time factor by measurement, and this is indicated by the levels of significance through the use of the statistical law (T) for independent samples, as all variables had less than a significance level (0.05), which indicates the existence of significant differences between the two tests (the two groups).

Discussion:

Through the presentation and analysis of the results obtained by the researcher in Table (4), it is clear that there are significant differences between the two research groups in the results of the post-tests and in favor of the experimental group. More effective than the exercises of the control group (the trainer's exercises), as they deliberately work on what the runner can achieve in the embarrassment of extreme stress when training at one level or closely, despite the appearance of fatigue when performing repetitions of the same exercise, and this requires him to expend high energy to perform this form of The training, which must be under a scale (10) of fatigue, and this is what the researcher emphasized when performing the exercises on the experimental group, , that this type of training gave the runners of the experimental group new adaptations that enabled them to show a high energy conservation and a less rapid indicator of fatigue, and this will certainly improve the level of runners, and (Benjamin K. Barry and Roger M. Enoka) indicates that the occurrence of fatigue leads to a decrease the electrical signal of the working muscles, and this in turn leads to a decrease in muscle strength due to the weakness of the muscle contractions generated, as the muscles in such cases protect themselves by

reducing the force of their contraction and this is explained by the theory of muscle wisdom (Muscle Wisdom), which states that the muscles work to reduce the rate The work of the motor units to match the change in the state of the muscle during fatigue" [(7)] , This is what the experimental group worked on in its training, which focused on the fatigue index being at its lowest levels, and this gave it preference over the control group, as well as the preference in the special speed endurance and achievement variable for the experimental group, as the high level of speed endurance is related to the muscle's ability to accept lactate and bear fatigue. And with the efficiency of the work of the central nervous system, as the latter bears the greatest burden of controlling performance and resisting fatigue under the conditions of training and competition, and this was confirmed by (Saleh Shafi Al-Aedhi) "The endurance of special speed is only integrated by the development of the efficiency of the central nervous system, the cardiovascular system and muscles and the readiness of these devices on performance at distinct rates" [(8)] , The ability to endurance speed expresses the interrelationship between the qualities of speed and endurance, and hence the importance of this ability emerges with the runner's ability to run the race distance quickly despite the accumulation of lactate in his muscles and blood, which helps to develop the achievement time, and this is what (Canova. Renato) indicated to him "Every activity is a speed activity because the winner is always the fastest athlete at the end of the race, and endurance is training to maintain the same speed over the entire competition distance"[(9)], The exercises according to the fatigue index prepared by the researcher confirmed that the performance should be in accordance with the ideal technique for the enemy, as it contributed to improving the movements of the arms and legs because it is similar to the movement of jogging, in addition to that these exercises are performed under conditions of fatigue, which helped to improve the neuro-muscular compatibility, which in turn was reflected To develop your endurance of speed and thus achievement, and this was confirmed by (Lydiard Arthur, Gilmour) "The running technique is very important, the position of the body and the work of the arms and legs are important, once the basics of the correct technique are achieved in proportion to the nature of the effectiveness, we can develop endurance and strength to get the best The results from the athlete"[(10)] . Through what was mentioned, the importance of exercises according to the fatigue index in developing the research variables under study became clear. hostiles are exposed to in their training, which helped to develop the athletic level of the members of the experimental group, as modern and new methods help to develop the level of achievement to a large extent, and this is what (Raysan Kharib Majeed) indicated, "The group of exercises or directed physical efforts leads to adaptation or functional change in the organs of The internal body, which helps to achieve a high level of athletic achievement" [(11)] , the main goal in this type of training, as we mentioned earlier, is to develop the ability of the central nervous system to mobilize the largest possible number of muscle fibers, when lactate levels increase in the muscles and the state of fatigue increases after performing jogging exercises so that the runner can use his strength and speed in the most difficult and harsh conditions , and this was confirmed by (Canova. Renato), Our goal is to use residual force in the worst conditions, as can happen during the latter part of the race. Through this type of

training we want to build the ability of the nervous system to mobilize a large number of fibers when the level of muscle lactate saturation is very high. Training is one of the most important special exercises to improve the final sprint in the race" [(12)] . Accordingly, the exercises according to the fatigue index specifically targeted the nervous system. The more the nervous system has a high ability to work in light of severe fatigue, the greater its ability to resist fatigue, which in turn affects the development of special speed tolerance because this ability is directly linked to the nervous system and thus improves achievement Whereas (Jamal Sabri Farag) asserted that endurance of speed "is the ability to maintain speed and in the presence of fatigue without decreasing that speed" [(13)] , The researcher confirms that the exercises that he prepared and implemented in the manner of a fatigue indicator had a great impact on developing the efficiency of the nervous system, which in turn was reflected in the development of all the variables investigated because these variables are linked to the nervous system, as indicated by the sources and scientific studies mentioned earlier, and this is what characterized the experimental group. About the control group, as the control group did not use these exercises in this way.

Conclusions and recommendations:

Conclusions:

1 The exercises according to the fatigue index contributed significantly to improving energy conservation, rapid fatigue, endurance of special speed and achievement for the 200m runner.
2 The improvement of the index of maintenance and rapid fatigue contributed to the improvement of the endurance of your speed.
3 Improving the index of energy conservation and rapid fatigue contributed to improving the achievement of the 200m runners.

Recommendations:

1 Adopting the exercises prepared by the researcher in the training program to develop the variables (under study).
2 The necessity of paying attention by the trainers of sprint activities, especially the sprint event (200 m), to improving the index of energy conservation and rapid fatigue because of their great role in improving endurance of speed and achievement.
3 Studying the use of fatigue indicator exercises on other running activities and other age groups

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