The effect of intensive aerobic foundation training on enhancing vo2max and aerobic intensity for advanced runners 5000m

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Abstract

The purpose of this paper is to preparing intensive aerobic foundation exercises to improve vo2max and aerobic density for advanced runners of 5000m, identifying the effect of intensive aerobic foundation exercises in enhancing vo2max and aerobic density for advanced runners of 5000m as well as, identifying the effect preference between exercises (control and experimental group) in enhancing vo2max and aerobic density for advanced runners of 5000m. The researcher used the experimental method in the manner of the two equal experimental and control groups and chose his research sample from the governorates of the middle Euphrates (Karbala, Babylon, Najaf) and the capital Baghdad (for the 5000 m competition) the category of applicants numbering 10 runners, and one of the most important research procedures was to determine the race test (5000 m) in order to determine the average The speed of the runners, to standardize the exercises, which include preparing various distances at a slower speed than the race speed by (1.15% - 1.25%) to know the effect of this rule (foundations) on the research variables, and to determine the tests for the variables of vo2max and aerobic density. The researcher used the appropriate parametric statistical methods for the work, which are (The arithmetic mean, standard deviation, Levin's law to find homogeneity, and (T) law's for symmetric and independent samples of equal numbers to find equivalence between the two groups, as well as finding differences between the pre and post tests and between the post-tests between the experimental and control groups. Aerobic exercises with the advantage of these exercises over the exercises used by trainers, the most important recommendations are the adoption of intensive aerobic foundations training in improving the variables under study and the need to pay attention to them by the trainers and those concerned with specialization, and apply these exercises to other activities and to different age groups.

Keyword: Intensive aerobic foundation training, intensive aerobic.

Introduction:

Athletics is one of the sports covered by scientific progress and quickly, and this is confirmed by the current figures, whether they are world records or numbers that exceed their predecessors. This can only be achieved by using the best scientific methods associated with them, such as sports training, physiology, biomechanics and other sciences. The 5000m running competition is one of the athletics competitions that is characterized by excitement, suspense and competition between runners and this competition depends in its performance on its own physical and functional abilities and on energy production in the aerobic system. The need for oxygen consumption during training or competition, Maximum oxygen consumption is a measure of aerobic capacity because it is considered an indicator of the body's ability to produce the largest
amount of aerobic energy per minute, as increasing oxygen consumption means increasing the muscle's ability to produce energy. An ideal basic rule for runners, improving the aerobic intensity of runners (5000 m), which is represented by exercises within the aerobic energy system and with high training intensity, is one of the basic requirements for a successful runners training program in the general preparation period, because it is the main key to success in the process of high intensity training during the preparation period. This includes the ability of runners to deal with many of the physical elements of the event, the most important of which is the endurance of the speed of the event for a long period. Therefore, when preparing training programs for runners, the training must aim to develop these variables and take into account the gradation of the loads used, recovery processes, and appropriate training methods and methods so that the training process is effective and effective and achieves the goal for which it was built, hence the importance of research in preparing intensive aerobic training exercises and including them within The training curriculum for runners to obtain satisfactory results in the variables under study to bring runners to the best athletic levels.

Research problem:
Through the follow-up and field experience of the researcher, being a trainer in this field for many years, he noticed that there is a noticeable decrease in the level of achievement in the long distances in general and the 5000m race in particular, and when comparing the recent results achieved in the Iraq Club Championship, the second round where the recorded record was 15.37.60 minutes and the Iraqi record was 14.00.58 minutes with the world record of 12.37.35 minutes. We find that the difference is very large, which made the researcher research and study the reasons for the poor achievement, which he attributes to the weak interest in training the basic air base. According to accurate scientific planning according to the requirements of the target time for each runner during the basic preparation period (the general period), and I said the use of modern methods in the training process at this stage to build a solid and strong air base as it serves the runners during high intensity training during the periods of special preparation and competitions. Runners face these exercises and thus reach the training plateau and then not achieve the desired goal, so the researcher turned to study this problem by adopting modern exercises that are directly related to the achievement of the runners and rationing the intensity of the exercises according to this achievement through training in the armpit of the race speed in proportions (1.15 - 1.25 %) May you add or treat even a small thing from this decline in the service of the sports movement in our dear country.

Research objective:
- Preparing intensive aerobic foundation exercises to improve vo2max and aerobic density for advanced runners of 5000m.
- Identifying the effect of intensive aerobic foundation exercises in enhancing vo2max and aerobic density for advanced runners of 5000m.
- Identifying the effect preference between exercises (control and experimental group) in enhancing vo2max and aerobic density for advanced runners of 5000m.
Research hypotheses:
- Intensive aerobic foundation exercises have a positive effect on enhancing VO2max and aerobic intensity for advanced 5,000m runners.
- The effect preference of the experimental group over the control group in the VO2max and aerobic density for the advanced runners of 5000m.

Research fields:
- Human field: Long-distance runners (5000m) in the middle Euphrates clubs and the capital, Baghdad, for the 2021 sports season.
- Time field: (10/7/2021) to (28/10/2021)
- Spatial field: Karbala Youth Stadium, Najaf Stadium, Ministry of Youth and Sports Stadium / Baghdad, Babel Stadium.

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 selected from the middle Euphrates Governorates (Karbala, Babylon, Najaf) and the capital Baghdad (for the 5000 m competition) the category of applicants, numbering 12 runners, and the researcher chose a research sample of (10 runners) in a random way and accordingly the sample formed a percentage (83.33) of the research community. Then he divided the research sample in a simple random way into two groups (control and experimental), and each group had five runners. The researcher made measurements for the variables (height, mass, training age and chronological age), and he performed the process of homogeneity on the research sample members using the statistical law (Levene's) in these measurements because of their impact on the studied research variables and isolate their impact, and it proved that the research sample members are homogeneous in these measurements. The variables were the moral level of the (Levene's) test, respectively (.286, .478, .694, .832) and they are greater than the level of significance (.05), which indicates the homogeneity of the research sample members.

The means, devices and tools used in the research:
The researcher used the following means, devices and tools:
Observation, test and measurement, hand-held electronic calculator, laptop computer, manual stopwatch, weighing device, legal track for athletics, various tools (red and white flags, starting cubes, shooting pistol).

Field research procedures:

Identify the race speed for the runners (5000m) for the research sample:

the researcher conducted a runners test (5000 m) in order to identify the average speed of the runners, to codify the exercises, which include preparing various distances at a slower speed than the race speed by (1.15% - 1.25%) to see the effect of this rule on the research variables. The achievement test was conducted on (Saturday) corresponding to (17/7/2021).

Identify tests and measuring research variables:

After the researcher reviewed the sources, references, theses, and scientific theses, the (Balke) test was determined for a period of (15 minutes) to measure vo2max, (identifying a 45-minute running test, which represents training at a speed slower than the racing speed by 1.15%) and specifying a 70-minute running test, which represents Training at 1.25% slower than racing speed) to measure aerobic density.

Description of the tests for the research variables:

First: Balke's test for (15 minutes) (1):

- Objective of the test: To measure vo2max.
- Test requirements: legal track for athletics, stopwatch, assistant, registration form - recorder - timer - absolute.
- Description of the test:- The testers stand behind the starting line and after hearing the start whistle, the testers go and the timers start with the timing. The timer determines the end of the run.
- Registration: The total distance traveled by the runner is calculated and recorded in a form, then the amount of vo2max is calculated through the excel equation, as shown in Figure (1).

![Figure (1)](image)

Figure (1) shows the calculation of the vo2max measurement through the Excel equation.

Second: Run (45 minutes) and run (70 minutes) (2):

- Objective of the test: To measure the density of air.
- Test requirements: legal stadium, stopwatch, registration form, recorder, absolute, temporary.
- Description of the test: The testers stand behind the starting line and after hearing the start whistle, the testers go and the timers start with the timing. Determine the end of the run, and the same applies to the test run (70 minutes).
- Registration: The total distance traveled by the runner is calculated and recorded in a form and for both times separately.

**Pre-tests**

The researcher conducted pre-tests for the members of the research sample numbering (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 implementing the exercises prepared in the training program. The tests were conducted on Saturdays, Mondays and Thursdays corresponding to (24-26-29/7) / 2021) at six o’clock in the afternoon at Al Shabab Sports Stadium in Karbala Governorate, after all runners were called.

**Equivalence procedures:**

After completing the application of the tribal tests for the variables under study, 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 (vo2max and aerobic density, 45-d run test, 70-d run test). The results proved that the two groups were equal, and the levels of significance were respectively (0.590,0.228,0.386), which is greater than the level of significance (0.05), which indicates the equality of the members of the two research groups.

**Main experience:**

The researcher worked on 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 modest experience of the researcher who gained through his practice of athletics as well as from his studies. The exercises were characterized by the exercises were carried out in the general preparation stage and they were started on Sunday (8/8/2021) for a period of (10 weeks) and three units per week and a total of (30 training units). The training units were implemented on Sundays, Tuesdays and Thursdays. The method of periodic training, and 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 Thursday (10/14/2021).

**Post-tests:**
After completing the implementation of the vocabulary of the training program, the researcher worked on re-applying the tests that were conducted in the tribal (before the experiment) on Sundays, Tuesdays and Thursdays (17-19-21/2021), and in the same time, place and steps for the pre-tests of the variables (under study) as much as possible.

**Statistical methods:** The search data was processed through the Statistical Package for the Social Sciences (SPSS).

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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tests</th>
<th>Arithmetic mean</th>
<th>Standard deviation</th>
<th>Mean of differences</th>
<th>Standard deviation of differences</th>
<th>T value</th>
<th>Level sig</th>
<th>Type sig</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>vo2max</em></td>
<td>Pre-test</td>
<td>63.4920</td>
<td>.12969</td>
<td>-1.07800</td>
<td>0.05314</td>
<td>-20.286</td>
<td>0.000</td>
<td>Sig</td>
</tr>
<tr>
<td></td>
<td>post-test</td>
<td>64.5700</td>
<td>.17205</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Aerobic intensity Running 45 min</em></td>
<td>Pre-test</td>
<td>12208.9833</td>
<td>28.52172</td>
<td>-172.76679</td>
<td>9.77746</td>
<td>-17.670</td>
<td>0.000</td>
<td>Sig</td>
</tr>
<tr>
<td></td>
<td>post-test</td>
<td>12381.7501</td>
<td>31.50998</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Aerobic intensity Running 70 min</em></td>
<td>Pre-test</td>
<td>17519.5230</td>
<td>40.92781</td>
<td>-163.49756</td>
<td>4.55897</td>
<td>-35.863</td>
<td>0.000</td>
<td>Sig</td>
</tr>
<tr>
<td></td>
<td>post-test</td>
<td>17683.0205</td>
<td>36.68798</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tests</th>
<th>Arithmetic mean</th>
<th>Standard deviation</th>
<th>Mean of differences</th>
<th>Standard deviation of differences</th>
<th>T value</th>
<th>Level sig</th>
<th>Type sig</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>vo2max</em></td>
<td>Pre-test</td>
<td>63.4460</td>
<td>0.12973</td>
<td>-1.56800</td>
<td>.02538</td>
<td>-61.788</td>
<td>0.000</td>
<td>Sig</td>
</tr>
</tbody>
</table>
Table (1, 2) 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, the variables (vo2max, Aerobic intensity Running 45 min, and Aerobic intensity Running 70 min) were greater in the post-test than the pre-test, and there was a significant change between the two tests in favor of the post, and this was indicated by the levels of significance through the use of the statistical law (T) for the correlated samples if it was for all. The variables are less than the level of significance (0.05), which indicates the existence of 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 displaying and analyzing the results in Table (1) of the tribal and remote tests of the research variables under study for the members of the control group, it was found that there were significant differences between the pre and post-test and in favor of the post-test. For the components of the sports training load and taking into account individual differences, and through the researcher’s field observations during the trial period for the members of the control sample, as well as continuous communication with their trainers, note that they are subject to multiple exercises aimed at improving the aerobic capabilities of the effectiveness, which in turn contributes to supporting the requirements of effectiveness in the special period, and this is what is confirmed by (3) that “the training programs that are codified and organized according to scientific foundations work on developing the physical and skill level of the players.” The researcher also adds that the training period taken by the research, which was estimated at (10 weeks), was sufficient to show differences in the level of the runners in the variables dealt with in this study, as this period is sufficient to bring about new adaptations to their functional organs and this is what is confirmed by (4) that “organized training results in an increase in the individual’s performance ability as a result of performing physical exercises for several days, weeks or months, by imprinting the body’s systems on the optimal performance of those exercises.”

As for the experimental group, the researcher was keen, in agreement with the trainers, that the other training days would have unified goals for all members of the sample and take into account the principle of undulation, especially after performing...
the experiment exercises, because of the difficulty of application and the degree of fatigue that occurred after the completion of their application, the researcher’s exercises were characterized by diversity in the distances, as well as the change in size and comfort between one circuit and another, where he emphasized (5) “In order to achieve the duties of the training program or the training circuit in line with the objectives of the training in each of its stages, the relationship between the degree of load and the rest period must be taken into account when forming or sequencing the amounts of Training loads in training units and weekly circuits up to monthly and then annual, as the process of adaptation requires training with high degrees of load, but it is not possible to continue using the same high load every day because this leads to a drop in the level and the emergence of symptoms of overload (vo2max) means the maximum aerobic capacity or the maximum value of oxygen consumption, and this shows us that aerobic training positively affects the process of improving and increasing the maximum consumption of oxygen and oxygen, and what is meant by aerobic training is that continuous or intermittent physical effort in which the muscle produces its energy largely dependent on the oxygen available in the muscle cell.

From this, it can be said that vo2max training must be characterized by working for long periods during the training dose, in addition to being aerobic work with the consumption of a large amount of oxygen in order to reach the stage of adaptation for the circulatory, respiratory as well as muscular systems to work in an atmosphere of maximum consumption, and this was confirmed by (6) The increase in VO2max depends mainly on participation in regular training programs, where it increases (5-25%) and this increase depends on several factors, including (training intensity, duration, frequency, and method and method of training used), (7) and indicates that VO2max is related to The efficiency of the oxygen transfer processes to the tissues and the processes of consumption of these tissues, as these tissues carry out the process of transferring oxygen to the respiratory system, blood, and the circulatory system. Skeletal muscles, respiratory muscles, consume energy and heart muscle in certain degrees, and the speed and volume of consumption is determined by the amount of oxygen contained in the venous blood. The exercises of the experimental group prepared by the researcher, as for the aerobic density variable, which means the possibility of runners to perform long distances with high efficiency. The results of the long-distance tests specified at specific times (45 minutes, 70 minutes), which gave the runners a high general endurance as well as an ideal functional possibility represented by the circulatory and respiratory systems to withstand physical exertion. These exercises were characterized by being codified according to the speed of the runner, which was applied at a slower than the speed of the runner in the race rate is (1.15%, 1.25%), and this is what forced the runners to deal with specific speeds and along the distance of the exercises applied to the runners. These exercises were characterized by high training intensity over the length of the experiment and earned them perfect adaptations due to the high and constant speeds, and this is what (8) indicated "The long run is a basal run, the last of which is sufficient to leave the runner moderately or severely tired. The function of the long run is to increase endurance. The distance or
duration required to perform this effect depends on the athlete's current level of endurance, and as a rule the athlete's longest run should be of sufficient length to give him confidence that his general endurance will not be limited in the races.

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

Table (3) 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.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Arithmetic mean</th>
<th>Standard deviation</th>
<th>T value</th>
<th>Level sig</th>
<th>Type sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vo2max</td>
<td>Control</td>
<td>64.5700</td>
<td>0.17205</td>
<td>-4.502</td>
<td>0.002</td>
<td>Sig</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>65.0140</td>
<td>0.13795</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerobic intensity</td>
<td>Control</td>
<td>12381.7501</td>
<td>31.50998</td>
<td>-14.772</td>
<td>0.000</td>
<td>Sig</td>
</tr>
<tr>
<td>Running 45 min</td>
<td>Experimental</td>
<td>12652.6954</td>
<td>26.25127</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerobic intensity</td>
<td>Control</td>
<td>17683.0205</td>
<td>36.68798</td>
<td>-18.072</td>
<td>0.000</td>
<td>Sig</td>
</tr>
<tr>
<td>Running 70 min</td>
<td>Experimental</td>
<td>18107.4130</td>
<td>37.56849</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (3) shows the statistical indicators of the results of the post-tests of the research variables that the members of the control and experimental groups underwent, as the results showed that the arithmetic mean value of the variables (Vo2max, Aerobic intensity Running 45 min, and Aerobic intensity Running 70 min) was greater in the post test of the experimental group than the control group, and a significant change occurred between the two groups in favor of the experimental group, and this was indicated by the levels of significance through the use of the statistical law (T) for the independent samples, as all variables were less than the level of significance (0.05), which indicates the existence of significant differences between the two tests (the two groups).

Through the presentation and analysis of the results obtained by the researcher in Table (3), 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, and the researcher attributes the reason for this preference to the fact that the exercises used by the researcher (Intensive aerobic core training) to improve these variables, it was more effective than the training of the control group (training the trainer), as it confirmed that the training (running) should be at a slower speed than the runner’s speed in the race by (1.15%, 1.25%), despite the appearance of fatigue when performing the repetitions of the same exercise, and this requires the Runners work with high effort and high training intensity to perform this form of training, and this is what the researcher emphasized when performing the exercises on the experimental group. The researcher confirms that successful running requires a good training program, and there is no
single program to be the ideal method, and we can use many different regimens for the same goal, and (9) indicates “(athletes who have VO2max) with higher values can train at a higher intensity than those For those who do not have good preparation, many studies have shown that an athlete can increase VO2max with vigorous or intense training that raises the heart rate to (65-85%) of its maximum heart rate and for at least 20 minutes b) (3-5) times a week,” and (8, 37) indicates “the VO2max” increases during physical exertion. It increases the ability (20) times, and at high physical exertion, the cardiac oxygen output increases by up to (10) times with the increase in the maximum consumption of oxygen. More than (50%) of the muscles of the body in the cheek to the maximum for the consumption of oxygen, and this was achieved by the exercises of the experimental group.

The exercises prepared by the researcher, which was characterized by performance at speeds lower than the racing speed in the aforementioned ratios, gave the experimental group high functional adaptations and enabled them to become more capable of producing (ATP) through aerobic metabolism, and that the cardiorespiratory system and the aerobic energy system became more adequate by delivering Oxygen to the working muscles and the conversion of carbohydrates and fats into energy, and thus earned them to build an excellent aerobic hall that supports the training during the preparation period to reach the athlete to the best levels, and this was confirmed by (10) “High intensity aerobic training gives athletes physiological adaptations that include improving the first type muscle fibers as well as Capillary vascular function, blood volume, red blood cell count, intramuscular fuel stores, size and density of mitochondria improve, aerobic energy metabolism (the recruitment of free fatty acids), glycolic oxidative enzymes, volume and output of the heart and blood vessels within the muscles improve, which is due to increased blood flow to the muscles. Give the most effective and positive feedback to the experimental group control, and the researcher confirms that runners who have a good and solid air base will have a great role in training and improving special abilities, so the runner who has high aerial endurance will have a positive effect in endurance force and speed endurance, and this was confirmed by (11) “The general endurance is the rule The basic in developing the strength and the length of the speed, and the more the player has good oxygen energy, the more he has the ability and energy to continue to finish the largest possible amount of work, and that the presence of the maximum amount of oxygen in the player depends on some biological factors, the most important of which is the number of heart beats per minute and the speed of flow Blood in the circulatory system, vital capacity and others, and that the player’s steadfastness in front of permanent motor performance in any form of sports depends on the efficiency of these devices and their ability to resist, and this endurance depends on aerobic respiration, meaning that the player cannot gain energy without acquiring oxygen from the air (aerobic respiration).

The researcher believes that the aerobic exercises in the general preparation period should be related and serve the specialized effectiveness, and we must reach the runner to a high level of aerobic potential at the end of this period in order to be a good base of the elements of physical fitness, and this requires that these exercises be of high training intensity And it has to do with the digital level of the runners, and this will give the coaches objectively legalizing the training intensity and good scientific foundations
to reach the best levels in this period of preparation, and thus it will give the runners to be able and ideally to perform the exercises in the period of special preparation and raise the special physical abilities better to achieve the best digital level and this is what

The model training process aims to him, and this is what (12) indicated: “One of the characteristics of this period is that the load size in it is large and the intensity of the load is less than in the special preparation period of the preparation stage. To perform a load of higher intensity during the special preparation period and qualifies him to reach a stable athletic level during the competition stage. Aerobic requires the implementation of large training loads with the use of an intensity exceeding the threshold of the anaerobic band, i.e. the intensity that leads to increase the concentration of lactic acid in the blood (3-4 mmol/L), This is what was implemented in the exercises of the experimental group that underwent training slower than the racing speed by (1.15%, 1.25%) to obtain a high training intensity to improve these capabilities, and this was confirmed by (13) that “Achieving adaptation in endurance training does not depend on the size of the load Training alone, but also on the intensity of the training load. It turns out that using high intensity exercises leads to better results than using low intensity. He adds that when using aerobic exercise at high intensity, it gives positive benefits to all the organs of the body responsible for transporting oxygen, and performance must be at an intensity level at an average rate. Heartbeat of (145-175) beats/minute, which leads to raising the functional efficiency of the heart muscle, and also confirms that the higher the level of aerobic potential, the greater the body’s ability to resist the increase in lactic acid production, and therefore the moment of increasing its concentration in the blood is delayed and vice versa. Anaerobic will appear later and when the athletes reach a maximum oxygen consumption and can continue to work for a long time and with high efficiency, and that when the training load is used intensely (90%) VO2max, A percentage of the anaerobic energy participates in the work with the participation of fast-twitch fibers, but in the case of using a lower intensity, the slow-twitch fibers are the ones that do the required work, and this was achieved in the experimental group exercises and gave them preference over the exercises of the control group.

Conclusions and Recommendations:-

Conclusions:-

- Intensive aerobic foundation exercises contributed significantly to improving the vo2max and the aerobic intensity of the 5000m runners.
- Intensive aerobic foundations training gave runners positive results for training in the period of special preparation for special physical abilities.
- The improvement of vo2max and aerobic density contributed to improving the endurance variables for the 5000m runners.
- Intensive aerobic foundation exercises have achieved an advantage over the usual exercises that trainers adopt in improving research variables.

Recommendations:

- Adopting the exercises prepared by the researcher in the training program to develop the variables (under study).
- The need to pay attention by the trainers of running activities for long distances, especially the effectiveness of running 5000m in improving the (vo2max) and the aerobic density because of its great role in other preparation periods.
- Studying the use of intensive aerobic training exercises on other running activities and other age groups.

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