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## The effect of overlapping aerobic and anaerobic training on the achievement of runners-3000 M hurdles running activity for men

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### Abstract

The importance of research come from the use of aerobic and anaerobic training (mixed order) to upgrade the record achievement of research samples the 3000 m hurdles runners, the research problem is training process of this group doesn't contain this training requirement the aerobic and anaerobic training (mixed order), so that the researcher would prepare a training units that includes this training requirement for the research samples the two advanced champions hurdles runners the members of the national athletics team of Iraq.

The researcher choose experimental design for research procedures which contain the pre-test and post-test, and then the researcher display, analyzed and discussed the test results Which showed a significant difference in the record achievement between the pre-test and post-test in favor for the post-test, The researcher shows the conclusion there is a lack in nested Aerobic and anaerobic trainings of 3000 m Iraqi hurdles runners, and the positive impact of these trainings on the level of record achievement for this competition runners and the researcher recommended the training programs of 3000 m hurdles runners must contain suitable amounts of these trainings.

**Keywords:** 3000 m hurdles, athletes, aerobic, anaerobic, overlapping training

### 1. Introduction

The event of running 3000 m hurdles is one of the sports events distinguished in difficulty and challenge and the difficulty of this sporting event lies in the interfering use of energy systems by the runners of this event during the time of its performance, although it is an aerobic effectiveness through the time it takes its performance, but it happens in most of the performance time that its runners move in terms of energy systems that control performance from one power system to another as they move from the aerobic system to the anaerobic system as a result of keeping up with the tactical methods of their competitors, but its effects are very clae give the stages of training and at the same time this transition is a negative burden factor on the runner, who does not have the possibility to work under it (without trainer).

At the time of it But if reinforced by similar experiences, especially if it is for the same person, it will be easier to achieve the scientific goal and reach the goal and through the field practice of the researcher found that the volume of aerobic and anaerobic training (overlapping) within the special training programs in the event of running 3000 m hurdles in Iraq is not enough, so he decided to study this problem in an attempt to activate the role of This is the necessary training requirement and invested effectively within the training plans of Iraqi athletics coaches. Therefore, the importance of the research lies in the fact that it take care on this way training requirement and works to help athletics coaches to include it in the annual training plans for runners of the 3000-meter running event hurdles that they do not depend on a single energy system for the processing of adenosine triphosphate (ATP) but depend on the overlap of systems as (David 1973) <sup>[1]</sup> explains that "the changes in the working muscles to produce the necessary energy during sports training using atmospheric air oxygen, depending in some sports events on aerobic work "(170:1) and in anaerobic work (Yonath, 1995) <sup>[2]</sup> indicates that obtaining adenosine triphosphate is done by destroying carbohydrates and producing lactic acid due to high intensity".

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The research aimed to: Preparing a proposed training curriculum that includes mixed system exercises for the effectiveness of 3000 m steeplechase. To identify the effect of aerobic and anaerobic (interfering) exercises in the achievement of 3000 m runners-up of advanced research samples at

### 1.1 The areas of research were

- Two runners in the 3000-meter hurdles event were members of the national athletics team.
- And the time range for the period from 1/1/2021 \_1/4/2021. - In the athletics track - the People's International Stadium. And the playgrounds of the College of Physical Education and Sports Sciences - University of Baghdad.

### 1.2 Definition of terms

**1.2.1 Aerobic training:** It is the exercises carried out by the athlete when the work is according to the oxygen energy system and these exercises are the basic element and the base on which the physical qualities of various sports are built, in which oxygen depends on the generation of energy necessary for performance and the intensity is moderate where the volume exceeds the intensity.

**1.2.2 Anaerobic training:** It is the exercises carried out by the athlete, which works according to the glycolytic or non-oxygen energy system, where the duration of this system reaches (60 s) and the work is very high and depends on the decomposition of sugar and results from the use of these exercises lactic acid as a result of the lack of oxygen during the process of glycogen decomposition in muscle cells in order to return adenosine triphosphate (ATP), where the accumulation of this acid leads to fatigue

**1.2.3 Aerobic and anaerobic training (interfering):** It is the exercises carried out by the athlete and he works under a mixture in the use of aerobic and anaerobic systems, as the competitive sports activity does not depend on the use of one energy system and the percentage of work in these exercises depends on the intensity of the effectiveness of performance and the time of it, there are physiological and laboratory indicators that can be inferred by them to work according to this system, when the heart rate during performance reaches (170 p / min), it means that the training in force is the mixed system and if Increase Heart rate for this rate, it means that the exercises in force are subject to the anaerobic system, and if the heart pulse drops to a rate less than (170 g / min) at the time, the work is according to oxygen exercises, as for the laboratory indicators, if we find the rate of accumulation of lactic acid in the blood immediately after performance (4 mmol), it indicates that the exercises in force are the overlapping aerobic and anaerobic exercises, if there is a percentage of lactic acid accumulation in the blood more than (4 mmol), it It indicates that the exercises in force are anaerobic, and if the measurement of lactic acid in the blood is less than (4 mmol), it indicates that the exercises in force are oxygen is dominant in performance's percentage

## 2. Research Methodology and Field Procedures

### 2.1 Research Methodology

The researcher chose the appropriate approach to solve the problem of his research, it is one of the main steps on which the success of the research depends, and one of the most efficient means of reaching reliable knowledge is the

experimental method" (Van Dalen, 1985) <sup>[3]</sup> The researcher used the experimental method in the style of one group with two tests before and after to complete this research.

### 2.2 Research community and sample

The research sample is one of the basic things that require the researcher to pay attention to it because the sample "is a number of individuals or things that are selected according to a certain rule or method of society" (Al-Fartousi, 2007) <sup>[4]</sup> (Hasan, B. B., & Hasan, A. A., 2022) <sup>[5]</sup>. The research sample included two runners in the 3000 m hurdles event from members of the national athletics team.

### 2.3 Means, tools and devices used in research

#### 2.3.1 Means used in research

- Arab and foreign sources
- Information network.

#### 2.3.2 Devices and tools used

- Track for running
- Time watch
- Whistle

### 2.4 Field Procedures for Research

#### 2.4.1 Exploratory experiment

In order to identify the difficulties facing the research sample, the researcher set a day 10/1/2021 to conduct the exploratory experiment.

#### 2.4.2 Pre-test

The researcher conducted the pre-test on the research sample on 20/1/2021 on the athletics track of the People's International Stadium (Tartan) and the test included running 3000 m hurdles.

#### 2.4.3 The units of the training program

A training program has been prepared that includes a focus on the training requirement aerobic and anaerobic training (mixed) and as a basic material within the vocabulary of the training program prepared and aims to raise the efficiency of functional devices as one weekly circle of the program includes three daily training units for the training requirement under research (mixed aerobic and anaerobic exercises) based on heart rate as an indicator to work within the limits of the overlapping aerobic and anaerobic system.

When the heart rate reaches between (168 p/min. - 170 p/min) indicates that the aerobic and anaerobic system participate in the reconstruction of adenosine triphosphate (ATP) equally, while if the heart rate reaches higher than the rate of (170 p/min), this indicates that the anaerobic energy system is predominant in providing the energy necessary to perform the activity, while the heart rate reaches less than the rate of (168 d/m), this indicates that the oxygen system is predominant in providing Energy needed (Howald H, 1977) <sup>[6]</sup>.

#### 2.4.4 Post-test

On 22/3/2021, the researcher conducted the post-test on the research samples on the athletics track of the People's International Stadium (Tartan) and it was similar in terms of the surrounding.

### 2.5 Statistical means

#### The researcher used

The law of evolution

$$\text{Ratio Evolution rate} = \frac{\text{Pre-test} - \text{Post-test}}{\text{Post test}} \times 100$$

### 3. Results

The researcher presented, analyzed and discussed the results of the data obtained through the pre- and post-tests conducted

**Table 1:** Shows the results of the tests of the research samples pre-test and post- test in the test of running 3000 m hurdles in minutes, reduced times and percentages at the level of digital achievement of the research sample.

S	Pre-test	Post-test	Difference time	evolution ratio
1	9,31,57 min	9,18,51 min	13,06 sec	1,421%
2	9,36,41 min	9,24,30 min	12,11sec	1,327%

#### 3.1 Presentation, analysis and discussion of the results of the research tests

It appears from what is included in Table (1) that the runner with sequence (1) had covered the distance of the pre-test race with a time of (9.31.57 minutes) while he recorded a time of (9.18.51 minutes) in the post-test with a development rate of (1,421%) This indicator shows that sample No. (1) represented by the runner with sequence (1) in Table (1) has been reduced (13.06 seconds) from his previous achievement achieved in the pre-test The sample No. (2) represented by the runner who bears the sequence (2) in Table (1) indicates his completion in the pre-test to record a time of (9,36,41 minutes) while he recorded in the post-test a time of (9,24,30 minutes) with a development rate of (1,327%) While recorded in the post-test a time of (9, 24, 30 minutes) and a development rate of (1,327%) This means that the time of completion in the post-test decreased from the time of the pre-test by (12.11 seconds) and that this progress in the level of the samples confirms the effectiveness of the training program that includes aerobic and anaerobic exercises (overlapping), where the effectiveness of running 3000 m hurdles depends almost absolutely on this training requirement being the effectiveness in use between medium and long distance events, so the researcher selected this development to achievement research samples to improve the aerobic and anaerobic potential of the functional devices of the research samples related to this requirement Which reflected positively on their physical abilities as the overlapping exercises included in the program prepared for the research samples, which ranged from its intensity to the amount of (170 p / min) and the resulting delivery of lactic acid to levels exceeding the capabilities of the mechanism to get rid of it led the research samples to perform high physical efforts in the post-test and its ability not to accumulate lactic acid at levels lower than what they were exposed to when they implemented the training vocabulary for the requirement under research within the program prepared for them and this It corresponds to what was confirmed by (Jonath, Hack Crumble) that "the physical qualities of the middle-distance runner, which are endurance and speed, and these qualities are important and are required to be developed to raise the level of achievement" (Al-Jumaili, 1983) <sup>[7]</sup> (BH Banwan, 2018) <sup>[8]</sup>

on the research samples in order to indicate and the degree of development incident at the levels of the achievements of the research samples as a result of the impact of the training program, which contained a high percentage of aerobic and anaerobic exercises (overlapping) where the research data was appears in Table (1) for presentation, analysis and discussion.

### 4. Conclusions and Recommendations

#### 4.1 Conclusions

- The existence of weakness in the use of aerobic and anaerobic training (overlapping) among Iraqi runners in the event of running 3000 m steeplechase.
- that the exercises aerobic and anaerobic (overlapping) led to the improvement of the achievement of running 3000 m in the research sample.

#### 4.2 Recommendations

Alert trainers of the 3000 m running event in particular and medium running events in general on the need to ensure the training plans drawn by the important training requirement (erobicand anaerobic training (intersecting)).

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**Appendix (1):** Represents a training curriculum for a weekly training course including the training requirement under research aerobic and anaerobic interfering trainings prepared for the research sample and extending to eight weeks

Day	time	The training events	Rest vs sequence	Exercise time	sets	Rest vs set	tension
Saturday	light	Continual running m 1000×4	— min/p 120	min 40-30	—	—	60%
	night						—
Sunday	light	Continual running aerobic and anaerobic interfering run m 600× 6	— min/p 120	min 40-30	—	—	60%
	night						min 1,35
Monday	light	m 1000×6 Continual running run with jump m 200×10	— min/p 120 min /p 120	min 40-30	—	—	60%
	Night						min/s 170-168 sec 42-40
Tuesday	light	m 150×16 hurdles Continual running techic	— min/p 90	min 40-30	—	—	60%
	Night						sec 18
Wednesday	light	min 60Endurance	—	180-170	1	—	75%
Thursday	light	aerobic and anaerobic interfering run m 1500×2 Continual running	— min/p 120	min 40-30	—	—	60%
	night						min/p 170-168
Friday							

For the purpose of calculating the intensity, the researcher used the law of maximum pulse, resting pulse and pulse difference as follows:  
 Intensity = (220 – age – resting pulse × percentage + resting pulse)