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Original Article

The Effect of Lactic Acid Training On Some Physical and Biochemical Abilities of 400-Meter Hurdlers

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Abstract

The goal of the article study: to establish the influence of lactic acid. Training The subject of the physical conditions in some places where people live might have seemed less worthy of such attention and biochemical abilities of 400-meter steeplechase athletes. As for the article hypothesis, there is an effect of lactic acid training on some of the physical and biochemical abilities of 400-meter steeplechase athletes. As for the article methodology, it was represented by using An experimental study design with two comparable groups was used. The intervention group underwent three training sessions per week, each lasting six weeks, involving tactical exercises, while the control group used the exercises prepared by the coach. The Army Club players for the 400-meter hurdles event, who numbered 6 players and were selected according to the method, represented the article community. The article used the statistical program SPSS to extract his results. The most important conclusions reached by the article are: The goal of the article study was to determine how lactation training affects certain physical and biochemical skills of 400-meter hurdles athletes. The experimental technique was used with two equal groups to reflect the article methodology. For six weeks, the experimental group performed lactic exercises created by three training modules; in the meantime, the placebo group took part in workout routines. created by the trainer. The article used the statistical tool SPSS to retrieve his results, but the most important findings were:

1. A clear increase in the amounts of explosive ability and strength characterized by speed of the legs.
2. High levels of testosterone.
3. High CPK rate

Based on the results and findings, the article suggests the following recommendations.
It is necessary to use lactic exercises in 400-meter hurdles training, as they operate with the same energy system prevailing in the event.

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1. Introduction

Sports activities have attracted a lot of attention from articles and scholars because they have become a symbol of the progress of countries. We see that the relevant institutions have taken upon themselves the task of adopting studies and article to reach the prestigious level to which all those concerned in this field aspire. Arena and field events are considered one of the popular games and are considered fun and exciting games.

Despite the scientific progress in the field of training, more article and studies must be conducted to reach many scientific facts in order to reveal the best methods and techniques to develop each sporting event in an optimal manner in an attempt to invest human energy to its maximum limits. Education and scientific training in the field of article are necessary to obtain scientific article, as well as to complete the science of that study. The 400-meter hurdles event is one of the activities that requires preparing all the body's vital systems in a way that is with regard to the level of intensity, one may liken this performance to something in nature. In addition, time, especially in the periods of public and private preparation for bringing the muscles and vital systems to the optimal level of performance, as this event is one of the activities that needs the participation of the largest number of people. The muscles are in most of their skills, and this requires preparing the body's entire organs well, in addition to increasing the efficiency of the vital systems through high-intensity lactic exercises similar to performance in races. Hence, the importance of article lies in identifying the effect of lactic training on the variables of strength characterized by speed and explosiveness of the legs and some biochemical variables.[1] For athletes, the 400-meter hurdles is one of the events that requires explosive movements of the legs in crossing the hurdles, as well as the distinctive ability to speed between the hurdles, in addition to vital requirements that are compatible with the requirements of effectiveness by the player or players during the race, which requires the players and the coach to prepare the body in terms of physical capabilities as well as these are the body's vital systems. Through the article's observation of many training units for many units, he found that there is a weakness in the use of lactic exercises that are similar to the nature of the race, and this is what prompted the article to use lactic exercises in training for the 400-meter hurdles event.

2. Methodology

The article used the experimental method to suit the nature of the article problem.

The Article Community and Its Sample

The article community was identified, namely the players participating in the army games tournament. They numbered 8 players, of whom 6 players were chosen intentionally, meaning 75% of as an example, the study sample was categorized into two groups: the scientific and article communities two groups, control and experimental, equally, as lactic exercises are used with the experimental group, while the control group takes trainer exercises.

Means of Collecting Information, Devices and Tools Used

The article used more than one method that could help him reach the facts. Many different article tools were used to ensure obtaining correct and accurate data to implement the article requirements. In order to ensure that valid and accurate data were obtained in order to meet the article needs, a variety of article tools were used, including:

- Arab and foreign sources.
- Observation and experimentation.
- Testing and measurement.

Field Article Procedures

1. Testing the explosive ability of the legs [2]

Objective of the test. Measuring the explosive ability of the legs.

Test specifications: From a standing position facing the wall, the tester marks on the numbered wall the height of the arm using a whiteboard marker. The tester then jumps vertically and marks the maximum point. The tester is also allowed to swing the arm twice.

Registration method: The difference between the first and second points is calculated. Each tester is given three attempts, and the best attempt is counted.

2. Testing the Speed Ability of the Legs

Test name: Jumping for the maximum distance/10 seconds.[3]

The aim of the test: to measure the strength and speed of the legs.

Test description: The tester stands around a specific mark on the ground, and after hearing the whistle, he walks in a straight line as quickly as possible. When the whistle sounds, the tester stands in a circle around a predetermined spot on the ground and releases the partridge as fast as possible in a straight line

Recording: The distance traveled by the tester is recorded within 10 seconds, and the tester is given one attempt.

3. Testosterone test [4]

Purpose of the test: To determine hormone levels in the blood.

Test Specifications: A sample of the player's blood amounting to (5 cc) was taken at Imam al-Sadiq Hospital in Hilla at ten in the morning, because the levels of testosterone are highest in the morning, and since the article sample is young men, the percentage of the hormone ranges between (3-10.6) ng.

4. Measurement of the Enzyme Creatine Phosphokinase (CPK)[5]

Purpose of the test: To measure the enzyme creatine phosphorus kinase

Test specifications: A blood sample of (5 cc) was taken from each player after 3 minutes of effort by an analysis specialist and then transported to Al-Razi Laboratories in Babylon for the purpose of extracting the enzyme level. Note that the normal percentage of muscle type (mm) enzyme ranges between (20-200) mmol.

Pretests

On Tuesday, October 12, 2023, at two o'clock in the afternoon, the article conducted pre-tests for the article sample at the Al-Mahawil Football Club stadium.

Equivalence and Homogeneity of the Article Sample

Table 1: Shows the Levine value, the calculated t value, and the significance level of the article variables

Variables	Control group		Experimental group		Calculated t value	Sig.	Levine value	sig	Indication
	mean	STD	mean	STD					
Explosive capacity	56.33	3.05	55	2	2.13	0.07	1.21	1.13	Non sig.
Power distinguished by speed	8.11	0.50	8.14	0.55	1.34	0.2	2.67	0.98	Non sig.
Testosterone test	2.40	2.98	2.63	0.44	0.38	0.7	1.4	0.24	Non sig.
CPK test	179	7	177	4.35	1.86	1.002	0.98	0.7	Non sig.

Main Experience

The article used lactic training at an intensity of more than 85% of the player's level, as the player was given exercises with or without resistance, at an intensity and at times that were compatible with the energy system prevailing in the game, which did not exceed 45 seconds per exercise for repetition, at a rate of two units per week and for a period of two months, that is, at a rate of approximately 16 training units, while the group used. The control is the same as the coach.

Posttests

In a similar fashion to the pre-tests, on Monday, December 20th, 2023, at exactly two in the afternoon at the Al-Mahawil Club Stadium, post-tests for members of the article sample were administered.

3. Results and Discussion

For instance, one may present the differences that exist between the pre- and post-tests of the control group and thoroughly analyze them.

Table 2: Shows the differences between the pre- and post-tests in the variables investigated for the control group

Variables	Pretest		Posttest		t value*	Sig.	Indication
	mean	STD	mean	STD			
Explosive capacity	56.33	3.05	60	4.35	2.65	0.01	Sig.
Power distinguished by speed	8.11	0.50	7.52	0.42	2.98	0.00	Sig.
Testosterone test	2.40	2.98	2.83	0.47	3.21	0.00	Sig.
CPK test	179	7	182	8.50	1.67	0.04	Sig.

* If we use a significance level of 0.05 and have a degree of freedom of 2

After presenting the results of the pre- and post-tests to the control group, it appeared that there were statistically significant differences between the pre- and post-tests for all tests. This means that the coach is maintaining a good level of performance with his players. It also indicates continuity and correct preparations for the players to participate in the sports gatherings held by the clubs. It was revealed that there were statistically significant differences between the pre- and post-tests for all tests after presenting the results of the pre- and post-tests to the control group.

Presenting and analyzing the differences between the pre- and post-tests of the experimental group

Table 3: In this study, the difference in pre- and post-test results of the variables under investigation is demonstrated in the experimental group

Variables	Pretest		Posttest		t value*	Sig.	Indication
	mean	STD	mean	STD			
Explosive capacity	55	2	63.66	4.04	1.87	0.00	Sig.
Power distinguished by speed	8.14	0.55	6.86	0.58	3.43	0.00	Sig.
Testosterone test	2.63	0.44	3.52	0.34	3.19	0.00	Sig.
CPK test	177	4.35	192.66	4.72	4.04	0.003	Sig.

* If we use a significance level of 0.05 and have a degree of freedom of 2

It was shown in Table (3) having revealed the findings of the pre- and post-tests for the experimental group that there were statistically significant differences between the pre- and post-tests for all the variables investigated, as the value of the significance level (sig) is less than the significance level (0.05), which indicates There is a significant difference in favor of the post-tests.

Presenting and analyzing the differences between the post-tests of the control and experimental groups

Table 4: The present study examined the differences among post-tests of physical characteristics between the control group and the experimental group

Variables	Control group		Experimental group		t value	Sig.	Indication
	mean	STD	mean	STD			
Explosive capacity	60	4.35	63.66	4.04	4.56	0.00	Sig.
Power distinguished by speed	7.52	0.42	6.86	0.58	3.23	0.00	Sig.
Testosterone test	2.83	0.47	3.52	0.34	2.65	0.02	Sig.
CPK test	182	8.50	192.66	4.72	3.56	0.00	Sig.

* If we use a significance level of 0.05 and have a degree of freedom of 2.

It was shown from Table (4) that the value of the significance level (sig) for the post-test. The difference between the control and experimental groups is significant at all levels $P < 0.05$) for every variable under investigation in the article, and this indicates that the experimental group achieved better progress in the level of the studied variables than the control group, and this indicates that lactate exercises similar to competition performance have achieved functional changes and adaptations that have contributed significantly to the physiological variables, especially to the variables of testosterone and the phosphocreatine enzyme, as these two variables are directly proportional to the amount of intensity used, as the hormone testosterone is largely related to the amounts of muscular strength. The amount of secreted hormones is determined according to the body's need for them, and their secretion decreases as the need for it decreases, "as each hormone is considered a chemical messenger with a specific function that circulates in the bloodstream and adheres tightly to blood proteins from the secretory glands to the target cell to perform its specific role.[6]

Testosterone performs important actions, which are among the requirements of physical effort, as it works to increase assertive behavior, and this is useful in competitions, the expansion of red cells, the increase in bone thickness, and the storage of glycogen, creatine, and creatine phosphate in the muscles. An increase of (14-73%) of the hormone level in blood plasma during high-intensity physical exertion.[6] As for the enzyme creatine phosphorus kinase, its quantities have increased significantly, and this is a result of the practice of sports training, as Abdul-Jabbar Rahima points out that it is certain that sports training creates physiological and chemical adaptive changes in many of the structural and metabolic components of muscle cells, and among these variables that have been recorded inside the cells are the changes that It occurs in enzymes, which are one of the changes most closely related to the process of sports training and the most influential in the athlete's ability to continue physical effort.[7] The sports training leads to several adaptations, including an increase in an oxygenic energy reserve (ATP-CP), as studies have proven that anoxic training led to an increase in the amount of enzymes that are sources of energy. Non-oxygen energy, including the CPK enzyme.[8]

4. Conclusion

1. A clear increase in the amounts of explosive ability and strength characterized by speed of the legs.
2. High levels of testosterone.
3. High CPK rate.

5. Recommendation

It is necessary to use lactic exercises in 400-meter hurdles training, as they operate with the same energy system prevailing in the event.

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