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The effect of short intermittent training on the development of lactic anaerobic capacity in soccer players U19

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Abstract

The study aimed to find out the effect of short intermittent training on the development of lactic anaerobic capacity in soccer players under 19 years old. The research sample was divided into two experimental and control groups, each group includes 9 players who were chosen in a deliberate manner, using the experimental method due to its suitability to the nature of the research topic. Where we used as a tool for the study the physical test (RAST test) to measure the lactic anaerobic capacity, and the data were processed statistically by the SPSS program, and finally the results of our research concluded that the effect of short intermittent training contributed positively to the development of the lactic anaerobic capacity of soccer players under 19 year.

1. Introduction

The improvement of training depends mainly on defining the performance components and requirements of the practiced activity So that we can develop them in a specific way, in an appropriate manner. Performance is the result of technical, tactical, biomechanical and psychological factors (Almansba , 2013), Football is one of the sports that needs all the components of physical fitness, and in order to improve it, the physiological and functional aspects must be upgraded (Ben Toumiya , 2019); Therefore, we find that football is a phased and reciprocal activity, and this is confirmed by it (Sannicandro , 2020), Where the football system is defined as an alternating aerobic and anaerobic sport. It is characterized by the performance of high-intensity intermittent movements, which are performed in an intermittent and non-cyclical manner, and it is a sport that develops aerobic and anaerobic fitness. As football is an activity with intermittent effort, this led to the emergence of training in line with the characteristics of this sport, and its emergence as an independent method in physical preparation. Namely, intermittent training which works according to (Dellal, 2008) Developing the aerobic and anaerobic aspect in a quantitative and qualitative manner that takes into account the dynamic nature of the football match. Intermittent training also has an important training effect as it improves the capacity of the aerobic and anaerobic systems, increases the aerobic and anaerobic enzymatic activities at the end of the intermittent exercise, and improves work in the case of acid accumulation (Reiss and Prevost , 2013), Also lies the importance of interval training according to (Dellal and Javier , 2017); In delaying the appearance of fatigue and the speed of recovery between classes. It also points out (Mansouri , 2020) It is necessary to go to training by the method of intermittent training with an intensity that exceeds the level of VMA to reach 120% of the VMA, where the lactic anaerobic bronchi are stimulated. The indicators of anaerobic and aerobic capabilities are a measure that reflects the level of efficiency of physical and functional preparation. Thus, each player has capabilities that must be compatible with the requirements of the motor duty assigned to him. Anaerobic and aerobic capabilities are the basis for energy production. In football, players need biochemical energy, which appears on the field in the form of physical effort. And in two forms, anaerobic energy and aerobic energy, which are prevalent throughout the duration of training and matches, depending on (Monod et al, 2007). Undoubtedly, the player needs a high level of anaerobic and aerobic capabilities, especially when it comes to the

efforts that enter into the anaerobic sector, which require high efficiency in producing the energy necessary for the occurrence of muscle contraction, and this is by stimulating the anaerobic side in one session that includes the various actions of the soccer player. (run, jump, hop, throw...). The fact that the researcher is one of those interested in studying this matter and in the absence of the intermittent training method in the period of preparations and competitions, and in light of the lack of field competence that is constantly lacking in regard to training methods, especially if it is related to the intermittent training method, In addition, the researcher noticed that the coaches did not rely on accurate numerical indicators resulting from the application of anaerobic tests in order to predict what the players and the team would reach after undergoing training and the possibility of future planning based on the fact that the functional aspect cannot be evaluated by observation, but rather based on accurate tests, and the possibility of predicting ability Anaerobes that depend on the efficiency of the respiratory circulatory system. And based on the scientific briefing, we decided to enter into this research, which shows the effect of the short intermittent training method on the lactic anaerobic ability of soccer players under 19 years old. This is what led us to ask the general question of the research as follows: Does the proposed training program with short intermittent training affect the development of the lactic anaerobic ability of soccer players under 19 years old?

1.1. Literature Review :

And since science is cumulative, since our research did not start from nothing, but rather on previous scientific postulates represented in previous and similar studies, including **(Hallouz and Hanat, 2019**) **entitled**: The effect of plyometric training in repetitive training and high intensity interval training on anaerobic lactic Power and Explosive power of 400 m runners; This study aimed at identifying the effect of plyometric training with repetitive training and High intensity interval training on Explosive power and anaerobic lactic Power of 400 m runners. The researchers used experimental method with one sample design using pre and post measurement. The sample of the study consisted of 6 runners from Tiaret city Athletics clubs (under 19 years category). The training program Contained 13 weeks with 2 training session a week. The researchers found that where a significance differences between pre and post measurement in

both Explosive power and anaerobic lactic Power in the favor of the post measurement. Where the size effect reaches 86% for the Explosive power, and 82% for anaerobic lactic Power. As conclusion the researchers conclude that plyometric training with repetitive training and High intensity training lead to improvement in both variables. We also find a study (**Mansouri Abdullah, 2020**) **entitled**: A comparative study between karate wrestlers (kata and kumite) in the level of some aerobic and lactic anaerobic physiological indicators; The study aimed to find out the difference between kata and kimiti wrestlers in the level of some physiological aerobic and lactic anaerobic indicators, where the researcher conducted his research on a sample consisting of two groups, each group includes 10 kata wrestlers and 10 kimiti, and they were chosen in a deliberate manner, and the researcher used the comparative descriptive approach The results revealed that there are statistically significant differences between the physiological indicators of lactic aerobic and anaerobic for kata and quantum wrestlers in the sport of karate. We also find a study (**Saihi Fouad et al, 2020**) **entitled**: The Effect of Training Program Using Intermittent Method of Speed Maximum Aerobic and Vertical Relaxation in The Under 17 Footballers. The study aimed to identify the extent of the contribution of the training program based on short reciprocal training on maximum aerobic speed and ascent for soccer players under 17 years old, estimated at 28 players, who were chosen by the intentional method and were divided randomly into two groups, the control and the experimental, and the experimental method was used. And I conclude that the training program based on short exchange training contributed to the development of the maximum aerobic speed and the advancement of soccer players under 17 years old.

Method and Materials

For the concretization of our research, we saw it was necessary to use the experimental method in order to answer our initial questions ; where he knows it (Boudaoud and AtaAllah , 2009); Objective observation of a particular phenomenon, which occurs in a situation characterized by tight control, and includes one or more variables while proving the other variables. The researcher chose the experimental design by using the experimental and control groups with two pre and post measurements.

A- Identify variables and how to measure them:

*** Independent variable:** short intermittent training.

*** Dependent variable:** lactic anaerobic capacity.

2.1. Participants

2.2.2.1.1 The sample and its selection method :

The research community is represented in the teams of the first regional division of the Constantine Regional Football Association, under 19 years old. As for the research sample, it was chosen in a deliberate manner, and it was represented by the Ain Al-Beida Union (USMAB) players for less than 19 years. Their number is estimated at 24 players, and they were randomly divided into three groups; Exploratory group (5) and (19) for two experimental and control groups.

Table 1. Shows the statistical parameters of the two research groups' coherence and equivalence.

Variables	Experimental group		Control group		Partici Pants	T Calculated	T Tabular	Significance statistics
	SMA	SD	SMA	SD				
Age (years)	17.67	0.54	17.65	0.50	9	0.45	2.10	Not significant
Weight (kg)	70.83	3.67	69.23	3.63		1.09		Not significant
Height (cm)	175.3	5.40	174.7	5.36	9	0.89		Not significant
Age of training	4.50	0.95	4.30	0.30		0.79		Not significant

Table No. 01 shows the differences between the experimental group and the control group in the basic variables before applying the experiment. Accordingly, we note that there are no statistically significant differences between all the basic variables between the two groups, as we find that the calculated t value was confined between (0.45 and 1.09) before the experiment, and this is when significance level 0.05, degree of freedom 16; This confirms the homogeneity of the two experimental groups in the basic variables before applying the basic experiment.

2.3. Materials

The collecting data materials used in the current study is the physical tests (RAST Test Running Based Anaerobic Sprint, It is a test designed at the University of Wolverhampton as a test with the aim: to measure lactic anaerobic capacity, It is measured in (watts). (Aurélien and Bolliet, 2012) test is performed once during the pre-test period and the post-test period.

2.2.1 The scientific foundations of the tool :

2.2.1.1 Stability And Validity of the test : In our research, the method of testing and re-testing on a sample of the same age phase of 06 players from

the same team where the physical test was applied to them. Then we calculated the Pearson correlation coefficient in which the result was 0.84 and this confirms that the test has a high degree of stability. The self-honesty of the test was calculated by calculating the square root of the stability coefficient and the result was 0.91, which indicates that the test has a high degree of honesty.

2.4. Design and Procedure

The study was conducted during the preparatory phase of the season between Septembre and Novembre 2022, After looking at several references in the field of sports planning and intermittent training, we came up with training programs, taking into account some basic principles that allow us to reach the achievement of previously established goals through the application of these training programs while preserving the health and safety of athletes and not to expose them to injuries.

After designing the program and before its implementation, it was presented to a number of coaches and professors with experience in the field of training and physical preparation in football, taking into account their observations and suggestions.

The duration of the application of the training program is (6 weeks), as the total number of training sessions is 12 training sessions, where the group experimental trains at the rate of two sessions 02 per week. The training sessions contain a set of intermittent exercises from the short form 10"-20". In the form of 10" seconds of running with 20" seconds of passive recovery And 15"-15" ; for 7' minutes of work and 7' minutes of active recovery between blocks, for 3 sets. Which aims to develop lactic anaerobic capacity exclusively. Where the duration of the training session is from 48 minutes. The intensity used in the training sessions ranged from 100% of the VMA. The intensity was monitored and controlled by means of (RPE), with an explanation to the players of the (Borg RPE) scale and what each number of the subjective scale means for the effort. The intermittent training unit usually consists of 2 to 5 groups of 6 to 12 minutes, as for the intensity of performance if the running exercises are 100% of the maximum aerobic speed (VMA) or greater, taking (active) recovery periods between groups, which are estimated at about 7 to 10 minutes (Dellal and Javier , 2017). After the eight-week training period comes the one-week post-test period,

which will be done according to the same protocol and conditions as the pre-tests.

2.5. Statistical Analysis

All statistical analyzes were performed using SPSS version 22.0, The following statistical methods were used: the mean, the standard deviation, the Pearson correlation coefficient, and the coefficient of difference T.

2. Results

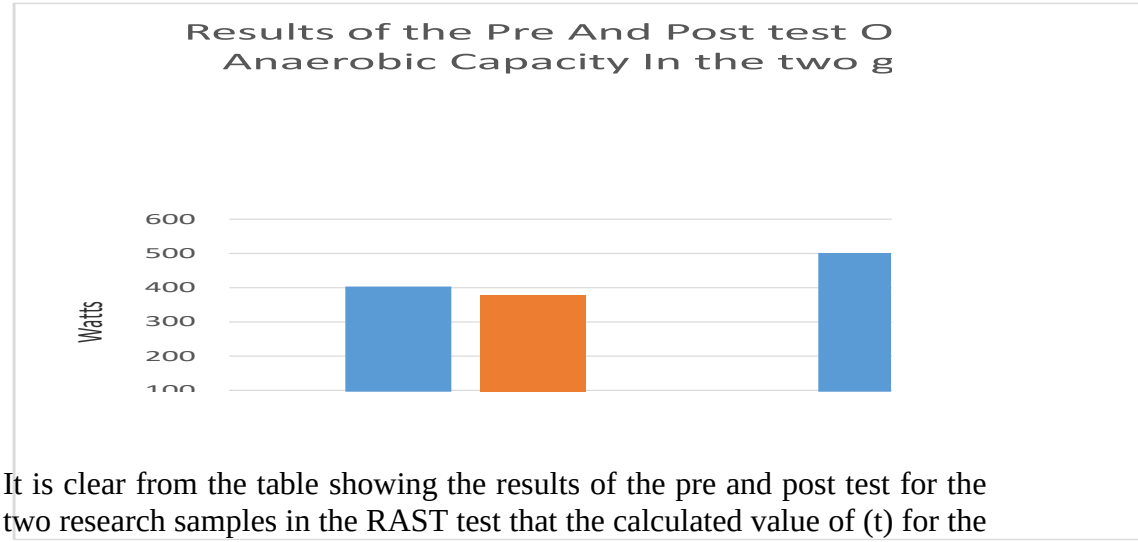
View and analyzes the results of the RAST test for the two

Table No. (02) shows the results of the pre and post test for the two research samples in Test RAST

RAST TEST	Pre-test		Post-test		T Calculated	T Tabular	Sample volume	Degree of Freedom	Sig Significance
	SMA	SD	SMA	SD					
Experimental group	403.22	63.31	501.19	79.88	4.13	2.63	09	08	0.02
Control group	379.33	62.27	384.51	65.97	2.26		09	08	0.06

3. research samples :

Figure 01. Shows the difference between the Arithmetic average of the results of the pre and post-test of the two groups on lactic anaerobic capacity.



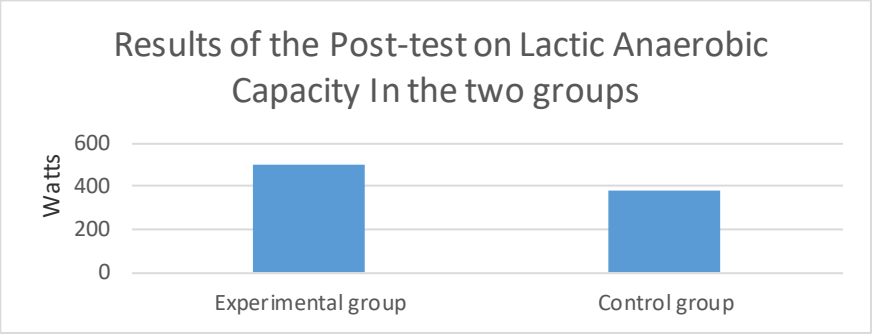
It is clear from the table showing the results of the pre and post test for the two research samples in the RAST test that the calculated value of (t) for the variables of the control group, which amounted to (2.26), which is smaller than the tabular (t) value (2.63) at a degree of freedom of 16, and was at a probability value (sig) (0.06) and therefore it is greater than the level of significance (0.05), which indicates that there is no statistical significance between the pre-test and the post-test RAST for the control sample; We also note that the RAST test for the experimental sample yielded the calculated (t) value (4.13), which is greater than the tabular (t) (2.63), as it was at a probability value (sig) (0.02), which is smaller than the significance level (0.05), and from it we conclude that there is Statistically significant differences between the pre and post test (RAST) in favor of the experimental sample.

3.1 Presentation of post-test results for the two groups

Table No. (03) : Shows the comparison of the results of the post-test for the two research samples in the (RAST) test

RAST Test	Post-Test		T Calculated	T Tabular	Sample volume	Degree of Freedom	Sig Significance
	SMA	SD					
Experimental group	501.19	79.88	3.54	2.57	19	18	0.04
Control group	384.51	65.97					

Figure 02. Shows the difference between the Arithmetic average of the results of the post-test of the two groups on lactic anaerobic capacity.



It is clear to us from the table showing the comparison of the results of the telemetry of the two research samples in the RAST test that the calculated value of (t) is (3.54), which is greater than the tabular (t) (2.57) at the level of significance (0.05) (α) ; degree of freedom (df) (16) ; Where it was at a probability value (sig) (0.04). Accordingly, we conclude that the apparent differences between the results of the post-test, which were statistically significant in favor of the experimental group, confirmed the effective development in favor of this group in the lactic anaerobic capacity compared with the control group.

4. Discussion

The proposed training program using the short intermittent training method program contributes to the development of the anaerobic lactic ability of

soccer players under 19 years old, through the statistical treatment of the results of the sample The experiment between the pre-measurement and the post-measurement. A statistically significant difference was observed in the test RAST, and this is shown by Table No. (02), and the researcher attributes this to the effect of applying the training program in the intermittent manner, short 10-20 So that the content of the proposed training program focuses on anaerobic energy production in the most effective way, as these exercises contributed to the use and demolition of creatine phosphate and glycogen The resulting muscle reliance on ability in the destructive performance of soccer players. Here, the researcher agrees (Abu Ela , 2003) Whereas, the physiological changes associated with the adaptation to the anoxygenic work of the lactic acid system appear in the increase in the ability of the rapid muscle fibers to break down glycogen to produce energy in the absence of oxygen (anaerobic glycolysis). In trained athletes, due to the increase in the volume of energy consumed by breaking down glucose without oxygen, as well as the ability of the athlete to perform and endure fatigue despite the conditions of lack of oxygen and the increase in the accumulation of lactic acid in the blood. Given the importance of intermittent training as mentioned (Dellal and Javier , 2017) ,The short intermittent exercises are important in improving the work in the acid state through the use of less anaerobic glycolysis process, which means saving glycogen stores and less lactate accumulation. . As you add (Billat , 2003) The use of short-term intermittent training such as 5-25/5-10/20-10 would improve the anaerobic capacity of the athletes. As some of the studies indicate, among them (Tariq et al, 2016) The value of lactic anaerobic power was 573.2 watts, As well as study (De Andrade et al, 2015) The anaerobic power indicators value was estimated at 562.4 watts, The researcher attributes this to the similarity in the measurement method, as the RAST test is used to obtain the lactic anaerobic capacity index, as it is one of the best and most widely used tests for measuring lactic anaerobic capacity. Through the statistical treatment of the results of the experimental sample and the control sample in the post-measurement, it was observed that there was a statistically significant difference in the lactic anaerobic ability test, and it was in favor of the post-test of the experimental sample, and this is shown in Table No.02, The researcher attributes this to the difference in the use of training methods in developing lactic anaerobic capacity, while the control group follows other methods. Among them is the method of continuous training, which, according to the researcher, does not

meet the modern requirements of the football player, in addition to being more boring, unlike the program prepared for the experimental sample. Of course it indicates (Dellal A. , 2008) The close connection between the training method, the time of performing the exercises, the work of the energy systems, and the gradation of the size of the training load through the repetitions that were carried out is one of the main reasons that contributed to this improvement, and the anaerobic endurance works to increase the efficiency in the muscle's ability to withstand the lack of oxygen and increase its ability to use power system anaerobes. as he points out (Nasereddin, 2014) Intermittent exercise increases the amount of energy production during a unit of time, so the volume and intensity of exercise is the determining factor for this increase. Accordingly, and according to the researcher's findings regarding the development of lactic anaerobic ability, Intermittent exercise increases the amount of energy production during a unit of time, so the volume and intensity of exercise is the determining factor for this increase. Also, the physiological preparation in football leads to directing training programs to develop anaerobic fitness so that the player can perform his technical duties efficiently without the early feeling of fatigue resulting from lack of oxygen during performance with the ability of the body's systems to quickly pay this debt during the low rate of play.The training units aim to develop and improve anaerobic energy production systems in line with the nature of performance according (Salama, 2001); Finally we can say that the research hypothesis, which indicates: There are statistically significant differences in the average scores of the players in the lactic anaerobic ability between the experimental group and the control group in the post-measurement due to the proposed training program.

5. Conclusion

This research came in order to know the effect of the application of short intermittent training in the development of the anaerobic lactic capacity of football players under 19 years old, based on the experimental approach, and a training program was applied, and using the RAST test, it was found to us after presenting, analyzing and discussing the results of the research that the method Short and medium interval training contributed to the development of the lactic anaerobic capacity of soccer players. The researcher recommends the necessity of training according to the energy

systems by determining the time required for each exercise, which is related to the ability or capacity. As well as working to improve some energy indicators, not just physical performance in its apparent form, because energy plays an important role in showing the highest values of physical superiority ; Also, this study is the beginning of a new breakthrough in this specialization, and it can be further delved into by conducting other studies to identify other physiological variables.

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