

EFFECT OF COMPETITIVE LACTIC TRAINING ON CREATINE ENZYME CONCENTRATION, PERFORMANCE ENDURANCE, AND TACTICAL BEHAVIOR IN FOOTBALL

Wathik Mohammed Abdallah

College of Physical Education and Sports Sciences,

University of Al-Qadisiyah, Iraq E-mail: wathik.mohammed@qu.edu.iq

ABSTRACT

The research aimed to study the effect of competitive lactic exercises on creatine enzyme, performance endurance and tactical behavior in football. The researcher used the experimental method in the manner of two equal groups, and the football players belonging to the Diwaniyah Sports Club participating in the Youth Football Premier League for the season (2022-2023 AD) defined their research community. They were randomly divided into two groups, experimental and control, each group consisting of (12) players, after excluding (4) players for non-regularity in training.

After that, the pre-tests were conducted, through which the homogeneity and equivalence of the two groups were calculated, and then the researcher proceeded to apply competitive tactical exercises similar to the nature of the performance, which took (8) weeks to be applied in the period of special preparation and by (3) training units per week, to reach the total training units (24) a training unit, and the most important conclusion of the researcher is that the development of creatine enzyme and endurance performance by the given exercises contributed to the development of tactical performance in football for young players.

Keywords: lactic exercise, creatine enzyme, performance endurance, tactical behavior, control group, experimental group.

INTRODUCTION AND THE IMPORTANCE OF RESEARCH

Sports training is one of the sciences that has achieved great progress through its association with other sciences and benefiting from its theories, principles, and research results. One of these sciences is physiology, which is the science that is concerned with studying the functions of the body's organs. From it, sports physiology is branched out, which is concerned with the study of physiological responses as a result of sports training. Football is the first popular game in the world, and the modern requirements in this game have created a great need to prepare the players physically and skillfully, as the development of the level of the player in football depends largely on the level of his physiological capabilities (aerobic and anaerobic) and on the extent of positive developments and chemical changes, which achieves the adaptation of the different body systems and the access of the player to the highest levels of performance and to achieve the best good results by following all that is new and creative in sports sciences, which is a necessity that must be taken into account when planning the educational and training process and its curricula.

Competitive lactic exercises aim to develop performance endurance by ensuring the creation of functional adaptations in the various organs and systems of the body. The lactic system exercises also work to develop the creatine enzyme and performance endurance, which in turn

raises the level of tactical performance of the players. Through these exercises, the training status of the players is improved according to scientific foundations.

And that the development in sports performance took a large part by focusing on the specialized level of football players and the type of target energy system, as the specialized process in it leads to upgrading the level of functional aspects that serve the game and that occur in the body as a result of effective practice to increase functional adaptation that occurs as a result of specialized training for the game, which helps in identifying the changes that take place, it will help those in charge of the training process to understand the foundations of these variables, and then identify the characteristic of carrying the performance of each player, and through it it is possible to stand on the training process and develop the physical level of the players in futsal because these changes are directly related to product the energy required to continue performing with high efficiency, hence the importance of the research.

Research problem

Through the researcher's experience in the field of football for many years, he noticed a decline in performance endurance, especially in recent times due to the high physical and psychological burden and the basic energy system, which is negatively reflected in the technical level of the team.

The problem of the research was to develop competitive tactical exercises in the development of creatine enzyme, performance endurance, and tactical behavior in football.

Research aims

Identify the effect of competitive lactic training on the development of creatine enzyme, performance endurance and tactical behavior in football.

Identify the preference of the two groups in the post-test in the development of creatine enzyme, performance endurance and tactical behavior in football. Research hypothesis.

Research hypothesis

Competitive lactic training has a significant effect on the development of creatine enzyme, performance endurance and tactical behavior in football.

There are significant differences between the experimental and control groups in the post-tests, in favor of the experimental group.

Research areas

1. The human field: football players in Al-Diwaniyah Youth Sports Club in Al- Qadisiyah Governorate.

2. Time range: from 9/20/2022 to 1/23/2023

3. Spatial field: Diwaniyah Sports Club stadium Research Methodology

The researcher used the experimental method to suit the nature of the research.

Research community

The research community consisted of football players belonging to Al- Diwaniyah Sports Club participating in the Premier Football League for Youth for the season (2021-2022 AD), and they numbered (28) players, and they were randomly divided into two experimental and control groups, and each group consisted of (12) players, after excluding (4) players for non-regularity

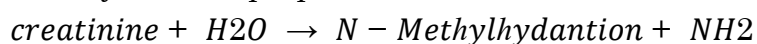
in training, and thus the research sample became (24) players, so that the percentage of the research sample for the community was (85.7%). Homogenization was conducted for the research community, and then they were divided into two equal groups (control and experimental), where the number of each group was (12) players.

Variants	Measruing unit	Control group		Variation coefficient	Experimental group		Variation coefficient	T value	Indication
		s	p		s	p			
Height	cm	171.00	3.87	2.26	170.43	3.87	2.27	0.89	non-moral
Mass	kg	63.29	3.15	4.97	64.43	3.91	6.07	1.13	non-moral
Age	year	23.86	1.77	7.43	24.14	1.46	6.06	0.92	non-moral
Training age	year	8.00	0.82	10.21	7.86	0.90	11.45	0.91	non-moral
Creatine enzyme	U/L	63.58	1.68	2.64	64.04	1.89	2.96	0.536	non-moral
Performance endurance	minute	2.26	0.22	9.73	2.22	0.21	9.45	0.638	non-moral
Tactical behavior	degree	5.82	0.73	12.54	5.75	0.78	13.56	0.831	non-moral

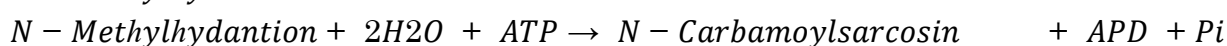
Field research procedures

First: measuring creatinine in the blood

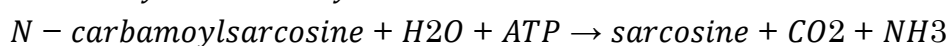
After application of the test strip, the sample flows into the reaction area, in the case of blood after separation of erythrocytes from plasma. A reaction catalyzed by creatinine iminohydrolase, creatinine degrades into N-methylhydantion, with the release of ammonia. In further reaction steps hydrogen peroxide is formed which reacts with the indicator to form a blue dye that is proportional to the creatinine concentration in the sample.



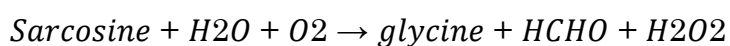
N - Methylhydantoinase



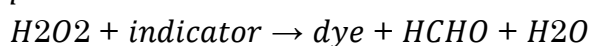
Carbamoylsarcosine hydrolase



Sarcosine oxidase



peroxidase



Procedures:

Lift the strip on the (test strip) and withdraw 32 μl of serum with a small pipette.

Place the sample as a drop in the designated area of the strip (red application area).

Place the test strip in the Reflatron device in the designated area for 15 minutes

At a room temperature of 37°C , the color depth that was formed at an absorbance of 642nm is measured within two minutes, and then a reading is made.



Fig. (1) German-made Reflotron device Second: circular skill performance test

The aim of the test: to measure the endurance of skillful performance.

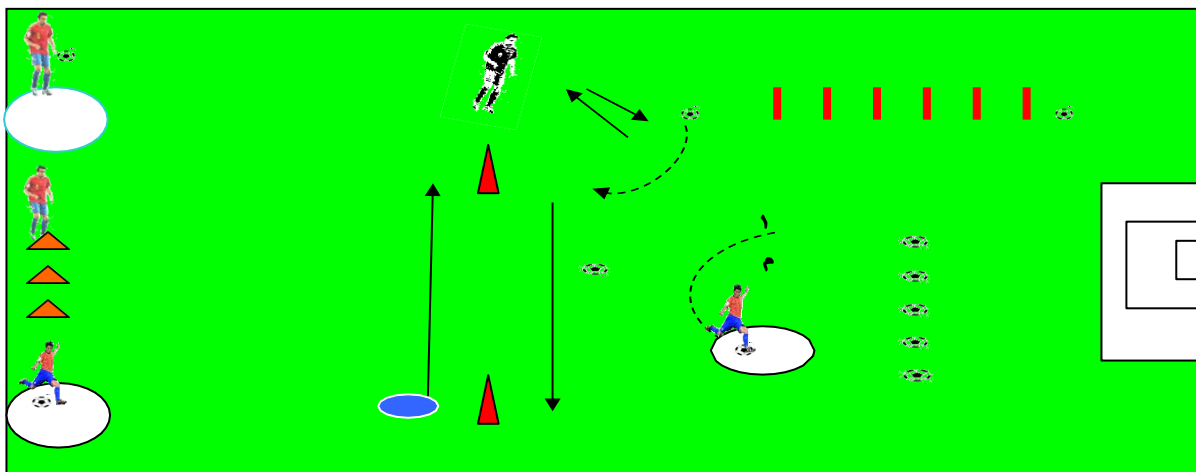
The tools used

(Stopwatch, (6) poles, three hurdles, football, (3) signs, registration form). Test characterization

This test is performed in the form of stations on the half-court lines, where the player begins when he hears the start signal and controls the ball within a circle of diameter (2) m 30 times, then follows it by running with the ball while jumping on three hurdles with a height of 50 cm and the distance between each of them (2) m , provided that he passes the ball under the barrier, then he runs with the ball towards the corner to kick the ball inside a circle drawn in the penalty area, then follows it to aim (5) balls from outside the penalty area, after which he makes a zigzag run with the ball (zigzag) between (6) distance indicators between each one and the other (1) meters, provided that he makes a wall pass with the coach, then runs (30) meters three times, one of which is with the (last) ball, and then runs quickly to the starting place, then repeats the performance after a rest period of (1) minutes.

registration method

The performance time is calculated for the two attempts together. Test conditions: The player is given a one-minute rest period between the first and second rounds, as in Figure (1).



Tactical performance test

The aim of the test: to identify the level of players' knowledge of tactical behavior during the game.

The necessary tools: test forms for the number of experts (Performance evaluation), a football field, video cameras, and stopwatch.

Test time: 45 minutes.

Rating System for playing

For the purpose of evaluating the performance of playing, we use the performance of playing evaluation system prepared by Stephen, Judith and Linda, which is designed to suit the collective and individual open games, which are (7) paragraphs for the player's technical and tactical movements during the game.

The system includes a game analysis observation form in a way that makes it easier for the observer to establish all the cases and variables that occur during the game, for giving a true picture of the game performance. The game cases were divided into two main cases:

Appropriate performance.

Inappropriate performance.

For fixing the performance evaluation with statistics in the observation form, it is possible to follow the Lakerth scale for the tests and distinguish them with five levels:

(5 marks) Adequate performance Very good (adequate); (4 marks) Adequate performance Good (adequate);

(3 marks) Adequate performance Medium (adequate); (2 marks) poor performance (inadequate);

(1 mark) very poor performance (inadequate);

The system designers indicate that it can be used with football activities. The researcher or observer can delete, modify or add some paragraphs in accordance with the requirements of the game.

There are notes about using the system, which are:

The aim of the system is to help teachers, coaches, and researchers to stand up to the level of evaluating the performance of their players through their performance during play, their decision-making, and their movement on the field.

Preparing in advance for how to implement the system and preparing the appropriate place to install notes.

That the performance of the players be evaluated in the event of possession of the ball or not, that is, the observer records the player's movements in the game and according to the state of play.

The observation system contains a special form for each game and is attached to the system to install the necessary data to facilitate the registration process with the observers.

Paragraphs of organizing the performance of the game:

Right move (adapt as per gameplay requirements).

It is the player's movement in an offensive or defensive manner as required in the smoothness of the game and has a relationship with the speed of movement. It also means that the player moves smoothly, accurately and quickly as required by the state of play, which leads to the implementation of appropriate movement behavior.

Decision Making

It is the process of making the appropriate decision about what to do and in what direction to hit the ball during the game, which is the process of directing the ball and exploiting the weaknesses of the opponent and investing the space in his favor and scoring a point or scoring a goal.

The player must choose the appropriate place and time for his decision to be correct, and on the contrary, it is an inappropriate performance.

Skill Execution

It means evaluating the performance efficiency of the skill to be implemented according to the correct technical performance, and with certain degrees of appropriate and inappropriate performance (determining the level of performance of the skill).

Support:

It means the appropriate move to support a colleague and receive a ball from him, seize the opponent, or fill the gap to allow the colleague an opportunity to penetrate into the opponent's arena, or move to preserve the skill.

Coverage

It is intended to fill the teammate's space when attacking, or to provide defensive assistance to the player who makes the play, or to move with him on the ball, fill the opposite space on him, and perform a duty in place of his colleague, for a limited period.

For the purpose of obtaining the scientific basis for the system used in evaluating the player's performance, Stephen, Judith and Linda found the validity of the system that measures the level of the player and put the scientific basis through their research in the United States of America on football.

They pointed out that there is a high sincerity in using the system on these games, and it obtained a stability of (0.68) in football.

How to calculate evaluation points for playing performance:

First: A- Evaluation of playing performance for each paragraph separately

$$= \frac{\text{appropriate number of repetitions}}{\text{inappropriate number of repetitions}}$$

and for each player, and so on for the rest of the paragraphs.

B- We replace the number of repetitions with degrees, and as we mentioned, we have one correct number.

$$= \frac{\text{the result of the first paragraph} + \text{the result of the second paragraph} + \text{the result of the third paragraph} \dots \text{and so on}}{\text{the number of paragraphs we used}}$$

B- After extracting the result of each player, we extract the arithmetic mean for the experimental group as well as the control group.

C- Then we compare the experimental group with the control in the mean and the standard deviations appear when the best result from this group.

Third: In the case of extracting the set of total use cases in the game, which = the sum of the appropriate iterations + the total of the inappropriate iterations in the first paragraph + the

total of the appropriate iterations + the sum of the inappropriate iterations of the second + the third + the fourth + the fifth + Etc., for each player, and we also extract the arithmetic mean and standard deviation of the group once for the control group and another for the experimental group.

As for the process of conducting a test to evaluate the performance of playing, it was for one round (45) minutes, and it was found that it would be more appropriate to perform the game between the experimental group and the control group. The observers wrote down the iterations of the appropriate behavior with its degree and the inappropriate behavior with its degree, after using a video camera and converting it to a disk, and the observers write down their evaluation.

Exploratory experience:

The exploratory experiment of the studied variables was conducted on a sample of players representing the research community on 9/20/2021. The aim was to identify:

The appropriateness of the tests to the sample level

Efficiency of the assistant work staff

Difficulties and problems that researchers may encounter when implementing the test

The time spent in carrying out the test and measurement. Pre-test:

At 5 p.m. on Tuesday 9/27/2021, the pre-test was conducted for the research sample in the studied variables at the Diwaniyah Sports Club stadium.

Competitive tactical exercises vocabulary:

After reviewing previous studies and scientific sources in sports training and the football game, as well as for training courses approved by the AFC, a competitive tactical training vocabulary was developed, taking into account the components of loads based on the level of players and the training stage, according to the following points:

The researcher takes into account the principle of diversity in giving competitive tactical exercises, as most of the exercises will be of a skill- tactical nature, ensuring that the players do not feel bored as a result of re- training itself, as well as similar to the nature of the competition.

The duration of the application of competitive lactic exercises is (8) weeks, with (4) training doses per week (Saturday, Monday, Wednesday, Thursday), and thus the total number of training doses is (32) training doses, using the high-intensity interval training method.

The vocabulary of lactic exercises was applied from 30/9/2022 to 19/1/2023.

The intensity used within the lactic system ranged between (80-90%) of the player's maximum ability, as the maximum intensity of the exercises used in the reconnaissance experiment was determined using the pulse for each player.

The researcher took into account that the exercises are of a competitive nature in terms of serious defense against various offensive plays.

Post-test:

At 4 p.m. on Saturday 1/22/2021 AD, the post-test was conducted for the research sample, taking into account the same conditions for conducting the pre-test as possible in extracting the study variables at the Diwaniyah Sports Club stadium

Statistical means:

(EXCEL) program was used for statistical treatments.

View and analyze the results of the studied variables for the control group

Table (2) shows the differences between the pre and post measurements of the control group in the studied variables

Physical tests	Measruing unit	Pretest		Post-test		Indication
		s	p	s	p	
Creatine	U/L	63.58	1.68	64.42	2.23	0.312
Performance endurance	minute	2.26	0.22	2.08	0.14	0.033
Tactical behavior	degree	5.82	0.73	6.55	0.75	0.043

The search results from Table (2) indicated that there are significant differences between the results of the pre and post tests of the control group in the variables (performance endurance, tactical behavior), as the significance level reached (0.033, 0.043), respectively, which is less than the error level (0.05) at the degree of freedom (11). While there was no significant difference between the pre and post tests in the creatine variable), as the significance level reached (0.312), which is greater than the error level (0.05) at the degree of freedom (11).

View and analyze the results of the studied variables for the experimental group

Table (3) shows the differences between the pre and post measurements of the experimental group in the studied variables

Physical tests	Measruing unit	Pretest		Post-test		Indication
		s	p	s	p	
Creatine	U/L	64.04	1.89	66.04	1.10	0.002
Performance endurance	minute	2.22	0.21	1.94	0.08	0.000
Tactical behavior	degree	5.75	0.78	7.13	0.77	0.003

- At the level of Indication 0.05.

The results of the research from Table (3) indicated that there are significant differences between the results of the pre and post tests of the experimental group in the variables of the study (creatine, performance endurance, tactical behaviour), as the significance percentage reached (0.002, 0.033, 0.043) respectively, which is less than the error level (0.05) at a degree of freedom (11).

View and analyze the results of the studied variables for the control and experimental groups

Table (4) shows the differences between the post-measurements of the control and experimental groups in the studied variables

Physical tests	Measruing unit	Control group		Experimental group		Indication
		s	p	s	p	
Creatine	U/L	64.42	2.23	66.04	1.10	0.034
Performance endurance	minute	2.08	0.14	1.94	0.08	0.008
Tactical behavior	degree	6.55	0.75	7.13	0.77	0.079

At the level of Indication 0.05.

The results of the research from Table (4) indicated that there are significant differences between the results of the post-test of the control and experimental groups in the study variables (creatine, performance endurance), as the percentage of significance reached (0.034, 0.008), respectively, which is less than the error level (0.05) at the degree of freedom (22). As for the tactical behavior variable, there was no significant difference between the two groups, as the significance rate reached (0.079), which is greater than the error level (0.05).

Discussing the results of (pre-post) and (post-post) tests for the control and experimental groups in the studied variables:

Through the results of the statistical analysis in tables (2), (3) and (4), significant differences appeared in the variables studied and for the control and experimental groups in favor of the post-test.

A significant development appeared in the variables of the study (performance endurance, tactical behavior) variables of the control group, as the researcher attributes this development to the vocabulary exercises given by the team coach and what the exercises included in terms of physical, skill and tactical performance at a high level and similar to the nature of the matches, which worked on a development in the variables.

And a significant development appeared in all the studied variables of the experimental group (creatine, performance endurance, tactical behavior), which used competitive tactical exercises with high intensity by the researcher, which were based on scientific foundations in terms of training volumes, stresses used, and appropriate rest periods that permeated the exercises of a skillful and tactical nature for continuing periods to target the endurance of the skillful performance that the players need to continue with the same efficiency from the beginning of the matches to the end during the skillful performance, which worked to develop the endurance, and this is what is required by the endurance of the performance in the football game,

The development of the creatine enzyme variable as a result of the trainings that targeted the side of special endurance according to the anaerobic energy system, which contributed to raising the capabilities of football players to perform the skillful aspects for relatively long periods under the anoxic system, as the group of exercises or physical efforts directed that lead to adaptation events or functional change in the internal body systems to achieve a high level of athletic achievement.

The development of the tactical behavior of the experimental research sample was due to the researcher taking into account that the exercises include the conditions and nature of the match and its specificity in each game, that is, that the exercises are similar to the conditions of the real match. Therefore, the researcher attributes this development in the performance of the experimental group sample to the link between training and the realistic conditions of the matches, and this is consistent with what some researchers have indicated that the successful coach always tries to make the player live in training as if he is in the race, by providing exercises similar to matches.

That is, the exercises are similar to the conditions of the real match. Therefore, the researcher attributes this development in the performance of the experimental group sample to the link between training and the realistic conditions of the matches, and this is consistent with what

some researchers indicated that the successful coach always tries to make the player live in the exercise as if he is in the race. This is due to the exercises he provides similar to the matches. We have shown in Table (4) the superiority of the members of the experimental group over the members of the control group in the variables ((creatine enzyme, endurance performance), while no significant differences appeared in the variable (tactical behavior), the researcher attributes this progress to the effectiveness of competitive lactic exercises in the process of raising the level of these variables because of the physical and skillful nature of these exercises (Scientific sources confirm that good rationing of training intensity in their different degrees and related to the type of specialized game is extremely important for both the coach and the player when preparing training curricula and when using the high-intensity interval training method), therefore, sports training leads to an increase in enzymes (creatine) with trainings, and these enzymes increase as a result of the catabolism that occurs in some cells, as well as through an increase in the permeability of the cell walls in excreting these enzymes into the blood, and the percentage of this increase is directly proportional to the intensity of the physical load. As for the endurance of football performance, it was better among the members of the experimental group and through the development of performance endurance, which occurred due to the effectiveness of the trainings given in a competitive atmosphere close to the nature of official matches, which led to the development of performance endurance with the help of the development of biochemical variables due to the nature of anaerobic exercises and similar to the nature of competition.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

The effectiveness of competitive lactic training in the development of creatine enzyme, performance endurance and tactical behavior of football players.

The development of the creatine enzyme because of the given trainings contributed to the development of performance endurance, and in turn was reflected in the tactical behavior.

No differences appeared in the tactical behavior between the two groups, since the training of the trainer and the researcher had an impact on the development of this variable.

Recommendations:

The adoption of competitive lactic exercises in the training curricula for football players.

Conducting similar studies for other age groups, and similar studies can be conducted on futsal players and other events, and knowing the results of these studies.

The use of the high-intensity interval training method because of its positive impact in developing the studied variables.

REFERENCES

1. Abu Ela Ahmed Abdel-Fattah, Ahmed Nasr El-Din: Physiology of Physical Fitness, Dar Al-Fikr Al-Arabi, Cairo, 2003.
2. Abu El-Ela and Ahmed Nasr: Physiology of Physical Fitness, Dar Al-Fikr Al-Arabi, Cairo, 1st edition, 1993
3. •Amr Allah Al-Senyati: the rules and foundations of sports training and its applications, Alexandria, Mansha'at al-Maarif, 1998.

5. Thamer Mohsen and Wathiq Naji: Scientific Foundations in Football Training and Its Basic Elements, Arkan Press, 1974.
6. Raisan Khraibet Majeed and Ali Turki Musleh: Physiology of Sports, Amman, Dar Al-Shorouk for Publishing and Distribution, 2002.
7. Qasim Lazam Saber; The foundations of learning and teaching and its applications in football, Baghdad, Dar Al-Hurriya for printing and publishing, 2005.
8. Kamal Darwish (and others): Physiological foundations for handball training (theories - applications), 1st edition, Cairo, Al-Kitab Center for Publishing, 1998.
9. Kamal Darwish, Emad El-Din Abbas, Mohamed Ahmed Abdo, Sami Mohamed Ali: Goalkeeper in Handball, Al-Kitab Center for Publishing, Cairo, 1st Edition, 1999.
10. Radcliffe, James C, & Farentinos, Robert C. High-powered Plyometrics: Human Kinetics, 1999.