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Effect of Anaerobic Capacity on Some Skills, Mental and Functional variables Among Players

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Abstract

Study purpose. The study aimed to identify the level of anerobic phosphagens and lactic ability of football and futsal players, and to identify the level of some basic skills, mental, and functional variables of the players. As well as identifying the differences of some mental and functional variables between football versus futsal players for phosphagen and lactic effort.

Materials and methods. The researcher used the experimental method, the research sample consisted participating players of the Iraqi Premier League of football (8) players, and futsal (8) players, n= 16 players, tests and measurements were used for the research variables, the researcher assumes that there are differences in the level of phosphagen and lactic oxygen capacity between football and futsal players.

Results. Results showed significance differences in Phosphagens capacity between football and futsal players, there are no differences between football and futsal players in basic skills, there are no differences between football and futsal players in mental abilities, there are differences between football and futsal players in mental abilities with lactic effort.

Conclusion. The researcher concluded the superiority of futsal players in the anerobic capacity, there is no difference in basic skills between football and futsal players with phosphagen and lactic effort, there are no differences in variables Physiological phosphagen effort, there are differences in favor of football players in pulse, respiratory rate, and heart energy, futsal players excelled in concentration and distribution of attention.

Keywords: Anaerobic capacity, Basic skills, Mental abilities, Football, Futsal.

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Introduction

The game of football is one of the sports games with various physical efforts and basic skills, which is reflected in the development of play tactically and technically, which has significant functional changes in the body of the players as a result of those efforts in the competition, where we see great interest in raising the level of players physically, skillfully, strategically, mentally and functionally by coaches in order to keep pace with technical events

in the competition between players, whether it is football or futsal (Ayuso-Moreno et al., 2021).

The anaerobic metabolism comprises the most crucial events in football, as it is a main determinant in sprinting, jumping, tackling and duel play. Elite football players perform 150–250 discrete intense actions that are brief in nature during a game. (McCalman et al., 2022) A futsal player is a player who moves quickly on the field of play throughout the match and increases in offense and defense, plays well one-on-one, shrinks in defense, and is not easily deceived, and covers the distance with and without the ball in the attack, shoots well, and achieves all of these with a tempo close to 80-100%. Therefore, it needs good anaerobic power and capacity (Balcioğlu 1a & Biçer, 2022).

Which led the coaches to pay attention to the development of the skill and mental aspects through exercises that suit the actual performance of the match from defensive and offensive movements and duties in order for the players to be the highest amount of preparation for the match, and this is only that the players have high functional aspects that help them overcome and confront the opponent and implement those duties accurately without prejudice to the functional or mental aspects such as poor concentration of attention or perception of distance.(Liao et al., 2021).

Which caused a defect in skill and tactical performance or loss of the ball, which means the competitor's exploitation of the situation especially that the play has become of a fast and sudden nature by the competitor, which means the possession of non-oxygen capabilities high for all players, whether in football or futsal, hence the importance of research in studying the impact of the ability to oxygen on skill performance and some mental and functional variables when football and futsal players and which is better in these variables to make them under the hands of football workers.(Miguel et al., 2021)

The problem of the research was that the game of football and futsal of collective games with multiple requirements, especially the physical, skill, strategic, mental and functional aspects and depends on all energy production systems in their performance to produce energy, especially that the game of football is considered with severe physical effort on the players through rapid and continuous running for a long period of time as well as the nervous and mental tension that permeates the match, Therefore the problem of research lack of knowledge by some coaches that the capabilities of oxygen phosphagen and lactic great importance in the success of the level of players by linking them to skill, tactical and mental exercises similar to the actual performance in the match and this is what has been observed in the field of poor physical performance at some times of the match, which may be due to the weakness of the mental abilities of the players and hence the problem of research to develop solutions to them and make them under the hands of football workers.

The research aims to identify the level of phosphagen and lactic oxygen ability of football and futsal players. And to identify the level of some basic skills and mental and physiological variables for football and futsal players. Also to identify the differences of some mental and physiological variables between football players and futsal for phosphagen and lactic effort.

The researcher assumes that there are differences in the level of phosphagen and lactic oxygen capacity between football and futsal players, and in some basic skills and mental and physiological variables of phosphagen and lactic effort.

Materials and methods

Study participants

The research sample that was deliberately selected was represented by the players of Al-Bahri Club and Al-Janoub Football and Futsal Refineries, (12) players were selected from each club, where Al-Bahri Football Club was represented by the percentage (48%) of the original community. As for the halls, they were represented by the players of the southern

refineries, and the percentage reached (85%) of the original community. The research conducted in Sports City Stadium, and Sports indoor hall of Naft Al-Basra Club for the period from October, 15-2024 to December,10/2024.

Study organization

The researcher used the descriptive approach to suit the nature of the research problem using the survey study.

Research Test

1. Oxygen Power Tests:
   First- Phosphagen Power Test: Running test at a maximum speed of 50 meters.(Boumedien Kada et al., 2023)
   Second - Lactic Ability Test: Partridge test with one leg on a wooden box to measure lactic anaerobic capacity for 60 seconds (Sonchan et al., 2017)
2. Skill tests
   First - Passing test towards circles drawn on the ground. (Banwan shareef, 2020)
   Second: Scoring test of stability towards a goal drawn on the wall.(Lee & Joo, 2024)
   Third: Winding rolling test between the signs.(McCalman et al., 2022)
   Mental abilities tests
   First – (Borden Anfimov) test to measure attention.(Johansson, 2021)
   Second - test sensory perception distance (Salimi et al., 2023)

Measurement of physiological variables the pulse, blood pressure and respiratory rate are measured by the player's sitting on the seat and the pulse device is linked and pressed on the wrist of the hand and at the same time the stethoscope is placed on the player's chest to calculate the respiratory rate after performing physical efforts to test the non-oxygen ability (phosphagen - lactic) each separately and the heart energy index is extracted according to the following equation :(Borges et al., 2022)

$$\text{Energy Indicator (EI)} = \frac{(\text{systolic blood pressure} - \text{diastolic blood pressure}) \times \text{pulse rate in minute}}{100}$$

The exploratory experiment was conducted on four players who were excluded from the main sample and the aim of the experiment was to identify the nature of the devices used as well as the exercises used and their suitability for the sample members.

The main experiment was conducted through the following:

1. Football players test for anerobic capacity, mental, and physiological abilities, where the phosphagen capacity test is performed, then directly the physiological aspects are measured by linking the pulse and pressure measuring device with the calculation of the number of breathing times by placing the hand on the player's chest, then focusing attention and distributing attention and perception.
2. Futsal players test for anerobic capacity, mental, and physiological abilities with the same procedure.
3. Testing football players for lactic ability, mental, and physiological abilities with the same procedures.
4. Testing futsal players for lactic ability, mental, and physiological abilities.
5. Testing football players by testing basic skills with a phosphagen effort.
6. Testing the futsal players by testing the basic skills with a phosphagen effort.
7. Testing football players for basic skills with a lactic effort.
8. Testing futsal players with basic skills with a lactic effort.

Statistical analysis

The statistical bag (SPSS) version 21 was used to reach the results.

Results and Discussion

First- anerobic capacity results

Table 1. shows mean, standard deviations and calculated (T) value of the anerobic capacity

Variables	Football		Futsal		calculated	Sig. degree	Sig. level
	Mean	St.d	Mean	St.d	(T) value		
Phosphagens capacity	5.9	0٫21	5.02	0.12	2٫6	0.002	Sig.
Lactic capacity	1669٫9	34٫9	1681.2	1.2	1.7	0.231	Insig.

Tabular (T) value = 2.347

Through Table 1, we find that the value of (T) calculated for the phosphagen ability is greater than the tabular (T) (2.1) at the degree of freedom (11) and the level of significance (0.05), which indicates the significance differences between football and futsal players, and we explain this significance to the ability of futsal players to have a higher phosphagen ability than football players because of their frequent reliance on rapid and sudden movement in the match, which requires them to conduct kinetic performances with all speed and high accuracy, the player during the match performs many activities that require fast performance such as sprinting and changing direction, jumping and others .(Souglis et al., 2023)

This indicates the high arousal of the glycogen cracking processes in the lack of oxygen during the match, so the speed of repeating high-intensity performance needs a specialized type of training, which can be achieved through anaerobic training (phosphagen), which is reflected in the production of energy more without the use of oxygen and this is one of the factors of high-intensity performance and the main goal of anaerobic training in football is to increase the effectiveness of players for high-intensity performance during the match (Constans et al., 2021).

Second- basic skills results

Table 2. shows mean, standard deviations and calculated (T) value for the phosphagen energy effort in basic skills between football and futsal players

Variables	Football		Futsal		calculated	Sig. degree	Sig. level
	Mean	St.d	Mean	St.d	(T) value		
Passing-degree	8.2	2.1	8.7	1.8	1.9	0.103	Insig.
Scoring-degree	13.4	3.1	12.8	2.7	0.89	0.321	Insig.
Dribbling-degree	13.34	1,22	12.88	1.4	1.3	0.521	Insig.

Tabular (T) value = 2.347

Through Table 2, we find that all the calculated values of (T) are less than the tabular (2.1) at the degree of freedom (11) and the level of significance (0.05), which indicates that there are no differences between football and futsal players in basic skills with phosphagen effort. we explain this insignificance to the ability of futsal players to have a higher phosphagen ability than football players because of their frequent reliance on rapid and sudden movement in the match, which requires them to conduct kinetic performances with all speed and high accuracy, the player during the match performs many activities that require fast performance.

Third- mental ability results

Table 3. shows means, standard deviations and calculated (T) value for the phosphagens ability effort in mental abilities between football and futsal players

Variables	Football		Futsal		calculated (T) value	Sig. degree	Sig. level
	Mean	St.d	Mean	St.d			
Attention concentration-degree	85.8	2.8	84.9	1.77	1.9	0.129	Insig.
Attention distribution-degree	8.3	1.21	8.1	1.6	1.09	0.401	Insig.
Distance perception- meter	13.4	1.54	12.89	1.2	1.44	0.131	Insig.

Tabular (T) value = 3.447

Through Table 3, we find that all the values of (T) calculated are less than the tabular (2.1) at the degree of freedom (11) and the level of significance (0.05), which indicates that there are no differences between football and futsal players in mental abilities with phosphagens effort. It refers to mental preparation in the successful players, these could help focusing on the game and encounter critical situations. However, they should rely on optimal concentration since excessive focus may cause stress and performance anxiety. To promote the unsuccessful players, coaches should provide a variety of strategies for delivering constructive criticism to help athletes adjusting movements and improving overall performance. Also, simulation training is recommended in order to prepare athletes to effectively handle the pressures of playing (Mohammad Ramdani et al., 2023).

Table 4. shows means, standard deviations and calculated (T) value for lactic capacity effort in mental abilities between football and futsal players

Variables	Football		Futsal		calculated (T) value	Sig. degree	Sig. level
	Mean	St.d	Mean	St.d			
Attention concentration-degree	83.2	86.4	83.5	2.094	3.1	0.000	Sig.
Attention distribution-degree	8.9	2.9	8.1	1.31	2.4	0.001	Sig.
Distance perception- meter	12.9	1.88	12.76	1.94	1.03	0.208	Insig.

Tabular (T) value = 3.447

Through Table 4 we find that the values of (T) calculated for both concentration and distribution of attention are greater than the tabular of (2.1) at the degree of freedom (11) and the level of significance (0.05), which indicates that there are differences between football and futsal players in mental abilities with lactic effort. We explain the significant of football players to the fact that the players are characterized by a lot of distribution and concentration of attention around the areas of the field and towards the competitor and colleague better than the futsal players, as well as the acquisition of this mental ability in exercises to be in line with the development of the game physically and tactically and this is confirmed by (Drigas, 2022) Despite the importance of focusing attention in the sports field and that it is considered a cornerstone in achieving basic duties, it takes enough time to train on it.(Drigas et al., 2022.).

Presentation and discussion of the results of the differences for physiological variables

Table 5. shows the arithmetic media, standard deviations and the value of (T) calculated for the phosphagen power voltage with physiological variables between football and futsal players

Functional variables	Football	Futsal	Calculate	Sig.	Sig.

	Mean	St.d	Mean	St.d	d (t)		
Pulse/ bpm.	147.3	1.09	148.6	0.93	1.21	0.187	Insig.
Diastolic pressure/mm.g	78.7	0.56	77.9	0.52	0.38	0.421	Insig.
Systolic pressure/mm.g	128.9	1.65	129.4	0.88	1.84	0.112	Insig.
Respiratory rate/rep.	30.6	1.63	31.8	1.21	1.72	0.302	Insig.
Cardiac Energy Index	337‹1	1.04	321‹2	0‹77	1.6	0.111	Insig.

Tabular (T) value = 2.347

Through Table 5, we find that all the calculated values of (T) are less than the tabular (2.1) at the degree of freedom (11) and the level of significance (0.05), which indicates that there are no differences between football and futsal players in the physiological variables of phosphagen effort.

Table 6. shows the arithmetic media, standard deviations and the value of (T) calculated for the lactic power voltage with physiological variables between football and futsal players

Functional variables	Football		Futsal		Calculated (t)	Sig. degree	Sig. level
	Mean	St.d	Mean	St.d			
Pulse/ B.p.m	155.3	2.2	158.2	1.7	2.6	0.000	sig.
Diastolic pressure/mm/g	76.2	0.33	75.3	0.31	0.88	0.271	Insig.
Systolic pressure/mm/g	132.2	1.4	131.4	0.66	1.5	0.121	Insig.
Respiratory rate/rep.	33.2	1.1	35.4	0.76	3.2	0.000	sig.
Cardiac Energy Index	316‹5	1‹3	321‹2	0‹77	2‹6	0.000	sig.

Tabular (T) value = 2.347

Through Table 6, we find that the values of pulse, respiratory rate and heart energy index are greater than the tabular value of (2.1) at the degree of freedom (11) and the level of significance (0.05), which indicates that there are differences between football and futsal players in the physiological variables with the lactic effort of these variables and we explain this morale for football players because football has a long playing time in addition to the large number of defensive and offensive movements and changes in the match performed endurance (Xu, 2022).

A special skill for the players in order to carry out these duties, which indicates the preference of football players with these variables, We also find that the pulse, respiratory rate and heart energy were more economical when football players as a result of the use of aerobic and anaerobic exercises, as well as the nature of the game, which depends on all energy systems in training that facilitates the process of blood flow and delivery to each member of the body during the physical activity practiced and this is what we find using physical capabilities with special endurance training help raise the physiological capabilities of players because of the purposeful training style and this is confirmed by (McCalman, 2022): The Using a purposeful approach in training is the important element in raising the overall level of the players (McCalman et al., 2022).

Conclusions

The study showed the superiority of futsal players in the non-oxygen phosphagen ability. There is no difference in basic skills between football players and futsal with phosphagen and lactic voltages. The study showed that there are no differences in the physiological variables of phosphagen potential. The study showed that there are differences in favor of football players in pulse, respiratory rate and heart energy. Futsal players excel in concentration and attention distribution.

Football coaches must be aware of the importance of energy systems in training and what is their role in developing the physical, skill and functional level of players. The need to use the measurements reached by the researcher during the study to know the extent of their importance for football players and futsal. Conducting another study of some mental, mental and functional variables in aerobic capacity.

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Conflict of interest

Author stated that there was no interest conflict.

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