



The Relationship of Some Special Physical Abilities and Skillful Performance with Some Physiological Variables and Immune Antioxidants and The Role of Sport in Enhancing the Immune Aspect of Soccer Players

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(Received 16 June 2023, Revised 01 July 2023, Published 26 July 2023)

Abstract

The current research studied the effect of soccer on some physiological variables and antioxidants in the body by measuring these physiological variables and measuring the levels of some antioxidants for young soccer players in Karbala Governorate and studying the correlation of these physiological variables with the physical abilities and skillful performance of soccer players. It was found that there is a significant correlation between those physical abilities and competent performance and between physiological variables and antioxidants, which included (heart rate, blood pressure, lactic acid, and maximum oxygen consumption) in addition to the presence of significant differences in the concentrations of antioxidants cortisol hormone and catalase enzyme for the players. The research sample was identified as the Karbala Youth Club players for the 2022 sports season, whose number is (110) players, compared to the control group, which amounted to 70 people of similar height, weight, and age group. Research depends on statistical methods such as (mean, S.D, and simple correlation coefficient).

How to cite: - Alyaa Aziz Gubiar Al-Nasrallah. The relationship of some special physical abilities and skillful performance with some physiological variables and immune antioxidants and the role of sport in enhancing the immune aspect of soccer players. *Aca. Intl. J. P. Sci. 2023;01(2): 01-09*

The aim of the study:

- 1- Identify some physiological variables among the Karbala Youth Sports Club football players.
- 2 - Measuring the hormone cortisol and the antioxidant catalase immunoglobulin enzyme in the players compared with the control of non-players.
- 3- To identify the correlation between some physiological-immune variables and the skillful and physical performance of the Karbala Youth Sports Club football players.

Keywords: - special physical abilities, lactic acid, blood pressure, cortisol, catalase

Introduction:

Football is one of the essential sports in the players possess different physical characteristics mixed with physical and skilful performance [1]. This study focuses on knowing the physiological adaptations of the body systems of soccer players through special tests [2]; the improvement reached by the players, primarily since the skilful and physical performance is associated with the level of interdependence between physiological variables and adaptation in performance [3]. One of the most critical roles for football players to reach a high level, especially in preparing players, is to prepare them physically and skillfully to ensure the effectiveness of their performance during playing [4-5]. There is a discrepancy among the players in the level of physiological variables and their impact on skillful and physical performance [6].

Functional - Physiological Abilities and Their Relationship to Sports**1- Heart rate**

The heart rate is one of the essential functional indicators through which we can infer the athlete's training status level. It is a term that refers to the rhythmic changes in the walls of the arteries because of filling them with blood pushed from the left ventricle during its contraction [7]. Specialists in the field of sports physiology and sports medicine believe that heartbeat recording is very necessary for every individual who practices any sport and that using heartbeats as an indicator of physical effort acts as a factor of security and safety and helps to encourage and urge the individual to continue working and sports performance [8].

2- Pressure of blood:

Referring to the power of blood on heart vessel walls, the blood pressure fluctuates in the cardiac cycle between systolic and diastolic pressure [9]. Aerobic exercise during physical effort increases the heart rate, affecting the cardiac output from the heart to the circulatory system, as it increases the value of blood pressure. Blood vessels reduce their contraction and relaxation during contraction and heart relaxation. Hence, the degree of their absorption of the amount of blood expelled from the heart decreases [10].

3- Lactic acid:

It is a chemical compound symbolized by (COOH-CHOH-CH₃) and is considered the final form of anaerobic glycogen consumption (without oxygen). Its ratio in the blood of the average individual at rest ranges from (8-12) milligrams, or about (1) mmol/liter. However, this percentage increases when performing high-intensity sports activities and at a low level of oxygen (Hypoxia) [11].

4- Maximum oxygen consumption (Vo₂max)

All scientific sources in sports medicine and sports physiology have agreed that the maximum oxygen consumption index (Vo₂ max) is one of the most important physiological indicators for athletes to assess the functional work of the heart, circulatory system, and respiratory system because this indicator reflects with complete specificity the maximum functional efficiency of the circulatory and respiratory systems. Maximum oxygen consumption means the ability to provide energy for (working) muscles during

exercises and sports competitions that last more than a minute and a half and depends on carrying out its functions on oxygen consumption as a standard for measuring physical fitness, especially the element of aerobic endurance. If this rate increases, it is evidence that the person or athlete enjoys high physical fitness and vice versa [12].

Levels of the hormone cortisol and the enzyme catalase in players:

Cortisol is a steroid hormone; during stress, the brain releases hormones, which in turn cause the adrenal glands to secrete cortisol and adrenaline [13]. Cortisol plays a role in many body systems, including the following: reactions to stress, the immune system, nervous system, and skeletal system and the breakdown of carbohydrates, fats and other materials [14]. The level of the cortisol hormone changes in the body during the day and is usually at its highest levels during the day. Although exercise can cause elevated cortisol, it decreases shortly after that, but in some cases, this rise continues for an extended period of up to several days [15]. The catalase enzyme is a protein that contains four heme groups, and it can use a hydrogen peroxide molecule as a subject material that donates electrons and another hydrogen peroxide molecule as an oxidizing substance that accepts electrons. Stopping free radicals formed from various causes [16].

Subjects and Methods:

Collection samples:

The study samples were selected, and tests were conducted from 15-17/4/2022 on the sample consisting of (110) players from the Karbala Youth Football Club after giving sufficient time to warm up, clarify the test and record the results according to the test conditions. Physical examinations were conducted on 15/ 3/2022 at ten in the morning, and after the players performed an excellent warm-up process, the required tests were performed. The skill tests (running / jogging/shooting) were conducted on Monday, corresponding to 3/16/2022 in the morning, at Karbala Stadium while participating in the Iraqi Youth League. In football, (70) individuals were collected, representing the control group of non-players, similar to them by weight, height, and age. Homogenization was carried out for the research sample individuals (age, weight, height, training age) and as shown in Table (1). Blood samples were also collected by drawing 5 ml of blood and separating it by centrifugation to obtain serum for physiological-immunological measurements (measurement of cortisol and catalase enzyme) using the ELISA technique [17].

Table (1) Homogeneity of the research sample individuals

Variables	M	S. D
Tall / cm	162.76	8.42
Weight/kg	65.44	2.32
age/year	18.53	0.76
Training age/year	9.71	1.45

Measurement of physiological-immunological variables:

1. Bruce's test to measure the maximum oxygen consumption (VO₂MAX): through a maximum physical effort on running [18].

2. Measurement of lactic acid: the researcher, accompanied by the assistant work team, measured the physiological variables using modern measurement techniques, as the Lactic Pro meter was used [19].
3. Measuring the pulse: using a medical device to measure the pulse rate.
4. Measuring blood pressure: The indirect method of measuring blood pressure is the most common.

Results

Table (2) means of the physical abilities and skillful performance of the players.

Physical capabilities	M	S. D	Sig.
Running	33.42	0.72	0.00
To run	3.458333	0.91	0.00
Aiming	13.635	0.61	0.00

Table (3) mean of the physiological tests of the players and the control group.

Physiological variables	Players		Control		Sig
	M	S.D.	M	S.D.	
VO ₂ MAX	2.31	0.17	1.45	0.22	0.00
Lactic acid	17.12	1.49	10.15	0.64	0.00
Heart beats	70.21	3.17	65.11	3.17	0.00
Blood pressure	112.11	3.49	111.75	3.49	0.00

Table (4) mean of the physiological-immunological tests of the players and the control group.

Immune - Physiological variables	Players		Control		Sig
	M	S.D.	M	S.D.	
Cortisol hormones	0.73	0.55	0.62	0.34	0.00
Catalase enzyme	0.204	0.211	0.159	0.164	0.00

Table (5) The association between physical abilities and some physiological variables

Physical capabilities Immune - Physiological variables	Running	To run	Aiming
VO ₂ MAX	-0.023	-0.793	-0.872
Lactic acid	0.475	0.648	0.644
Heart beats	-0.198	-0.032	-0.200
Blood pressure	-0.207	-0.519	-0.619
Cortisol hormones	-0.199	-0.055	-0.301
Catalase enzyme	-0.518	-0.654	-0.737

* Tabular value of the correlation coefficient at the level of 0.05

Through (2) table, we note that the calculated value is greater than the tabular value, which indicates a significant correlation with the skillful performance, which included running, jogging, and shooting for soccer players, which indicates a difference in the efficiency of those skills. As is the case with Table No. (3), as the calculated value is greater than the tabular value, which indicates a significant correlation, in addition to the significant differences between the group of players and a control group of non-players. It is noted that the correlation was significant with the physical test, running and the variable VO2MAX, as the football game is characterized by fast play and requires contractions and relaxation, which is evidence of the player's speed and the safety of his functional devices. We see its significance in the same variable with the motor speed of the arms, and the researcher attributes this to the contribution of the functional devices in the performance directly, so we see the compatibility in work between the contracted muscles, the development and increase in the rates of muscular strength of the arms. As well as the decrease in the period of contraction, the shorter the period of muscle contraction, the greater the muscle force produced, and the rate of contraction speed is higher [20]. Basketball is considered a fast sport, so speed is a necessary characteristic that the player must possess. [21]

It is noted through the results that the correlation between lactic acid and jogging is significantly associated with motor speed due to the length of the playing period. The speed at which the play is performed as the work under the lack of oxygen without getting enough rest, which leads to the accumulation of lactic acid in the blood, which in turn led This leads to the appearance of fatigue, which is eliminated by using part of it as fuel for the heart muscle, and another part is transformed into cologne, stored in the liver. In contrast, the other part is converted into ibuprofen, and the rest is excreted with urine [22]. The results of studies have indicated that the duration of lactic acid elimination (for the trained player) after physical exertion varies according to the intensity of the exertion, as it takes 25 minutes to eliminate half of the amount of lactic acid after maximum-intensity exercises, and this means that 15% of lactic acid is eliminated during an hour and a quarter after performing extreme exercises [23]. Cortisol is greatly affected by exercise and exertion, as exercise works to raise cortisol levels to a great extent, especially in the morning. It gradually decreases, especially in the evening, due to the body's biological clock [24]. At the same time, exercise also increases levels of the antioxidant enzyme catalase, as it removes free radicals from the body [25].

Conclusions:

- 1- A significant correlation between the physiological and physical parameters in VO2MAX and lactic acid and between running and speed.
- 2- A significant correlation between the physiological and physical parameters in systolic pressure, motor speed, diastolic pressure, and running.
- 3- A significant correlation between the physiological and skill variables in VO2MAX, handling and receiving the ball, and also with scoring. As for the variable of lactic acid, the significant correlation is with handling and receiving the ball.

4- Find a correlation between the physiological and skill parameters in systolic pressure, handling and receiving the ball, and diastolic pressure with scoring.
Serum adiponectin level is reduced in both GDM and IGTT. The reduction of the adipokine reflects the

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