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Table Of Content

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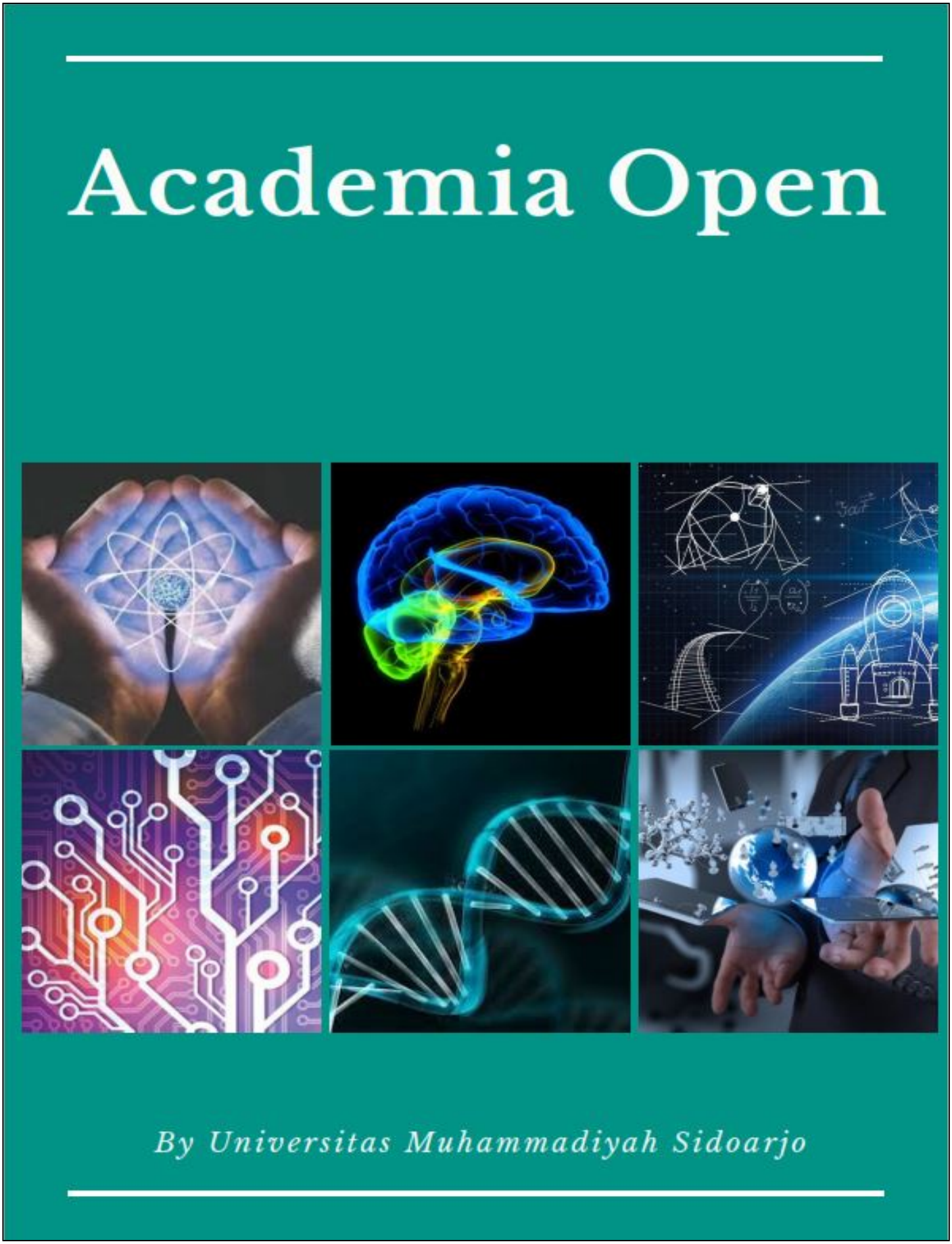

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Magnetized Water Supports Endurance and Hydration in Young Footballers

Air Bermagnet Mendukung Daya Tahan dan Hidrasi pada Pesepakbola Muda

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Abstract

General Background: Enhancing endurance and physiological efficiency is crucial for optimizing young football players' performance. **Specific Background:** Variable intensity training is widely recognized for improving endurance, while magnetized water has been explored for its potential physiological benefits. However, its combined effects on endurance and physiological indicators in young athletes remain underexplored. **Knowledge Gap:** Limited research has examined the integration of variable intensity training with magnetized water consumption in the context of football endurance. **Aims:** This study investigates the impact of variable intensity training and magnetized water consumption on special endurance and key physiological indicators in young footballers. **Results:** After a 16-week experimental intervention with 12 athletes from Al-Zawraa Sports Club, significant improvements were observed in strength endurance, speed endurance, hemoglobin levels, and blood viscosity. Magnetized water facilitated hydration, reduced fatigue, and enhanced oxygen transport, contributing to overall endurance development. **Novelty:** This study is among the first to demonstrate the synergistic effects of magnetized water and variable intensity training on young footballers' endurance and physiological adaptation. **Implications:** These findings suggest that structured fluid intake strategies incorporating magnetized water can optimize endurance training outcomes, offering valuable insights for coaches and sports scientists in developing evidence-based hydration and training protocols.

Highlights:

1. Boosts Endurance: Enhances strength and speed endurance in young footballers.
2. Improves Hydration: Magnetized water aids oxygen transport and reduces fatigue.
3. Optimizes Training: Supports evidence-based hydration and endurance strategies.

Keywords: Variable intensity training, magnetized water, endurance, physiological adaptation, young footballers

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Introduction

1. Introduction and importance of research:

Interest in sports on the one hand (physical, skill and functional development led to the creation of various methods, methods and training methods that relied on excitement, excitement and high effort) and change in the pattern of training and departures from traditional training, and the use of training methods aims to develop the level of athletic performance in order to achieve high levels of achievement.

The variable intensity training method is a new pattern used in recent years, which depends on the continuous change in the pattern of training during the single training module with distances and stresses. The use of this training aims to develop endurance and improve aerobic capability.

Sports researchers and practitioners gather on the importance of improving endurance, which is an important key attribute. It plays an important role in improving the level of achievement of most sporting events, as its inadequacy negatively affects achievement. "Athletes who possess a very high special tolerance, built on a solid base of general endurance, are easy to overcome various kinds of training and racing pressures". [1]

As is known, water is the underlying component of each tissue and organs of the body from the beginning of creation is an embryonic spur and enters into the formation of human brain tissue, heart tissue, lungs, kidneys and blood, so it is necessary to compensate for the water lost, (The water in its original nature is of vital and physical qualities very wonderful than the creation of the almighty Creator) But by going through filtration and filtering phases and adding chlorine, many of these qualities have lost it, so the water identity has been restored by introducing it into the magnetic field. According to magnets of special strength, after passing through the magnetic field many physical properties change, the most important of which is to increase the percentage of oxygen dissolved in the water and increase the ability to dissolve salts, acids and other properties, so it will be more vital and thus affect the physiological indicators, including sodium, potassium, calcium, iron and hemoglobin. [2]

Water when it passes through the magnetic field becomes more biologically vibrant and active, helping to improve the movement of blood and its delivery to the body's tissues and cells.

Hence the importance of research is reflected in the use of a variable-intensity training method and quenching with magnetic water in the development of special tolerance and some physiological indicators for young footballers.

2. Research Problem

By studying the great development of the game of football, we found that at the beginning of this century there was a wide change in soccer concepts and training. Training has become dependent on diverse, changing and varied training that has led to this development in the digital level. Moreover, footballers are one of the most athletes who loses a lot of fluids and mineral salts which needs the most water due to the length of game time, (Therefore, sterile (non-biological) water lost to many physical properties drank by athletes to bio magnetic water was replaced by a magnetic field pass to restore its vitality.) Many theoretical studies and some practical experiments indicate the influence of the magnetic field on the physical properties of water, which increases the efficiency of the functioning of different organs of the body.

It is this principle that the problem was crystallized by the researchers to conduct this study through the preparation of training exercises in the way of changing intensity with the intake of magnetic water for footballers as a modest contribution that can be placed under the hands of coaches and sports training workers.

3. Research Objectives

•Preparation of exercises in the training method of changing intensity and floating with magnetic water in the development of special endurance and some physiological indicators for young footballers.

•Know the training method of variable intensity and quenching with magnetic water in the development of special tolerance and some physiological indications to individual research sample.

1.4 Impose research:

•There are statistically significant differences between tribal and postgraduate tests in the development of special tolerance and some physiological indications of young footballers.

1.5 Research Scope:

1.Human Scope: A sample of young footballers for the 2023-2024 sporting season.

2.Time Scope: From April 13, 2024, to August 17, 2024.

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3.Place Scope: Football stadium at Al-Zawraa Sports Club in Baghdad.

Methods

3.1 Research Methodology:

The two researchers used the experimental method with tribal and postgraduate testing to fit it with the research problem.

3.2 Society and Sample Research:

The research community was the Baghdad Youth Clubs and the number of them (8) clubs. The sample of the research was chosen in a deliberate manner: the Al-Zawraa Sports Club, the Al-Shabaab Sports Club. 20 players, where the search sample was deliberately selected, and 3 players, goalkeepers, were excluded and 5 players were then randomly excluded to conduct reconnaissance experiments so that the number of search sample individuals who will carry out the main experiment (12) players and represent their percentage (60%) of the search sample.

3.3 Means of collecting information, devices and tools used in research:

3.3.1 Means of collecting information:

•Arabic and foreign references and sources.

•Personal interviews.

•Examination forms.

•Internet resources.

•Tests and measurements.

•Pilot experiments.

3.3.2 Devices and tools used in research:

•Magnetic suppression (Russian-made).

•Hemoglobin Blood Ratio Measurement Device (HB).

•Oximeter.

•Blood viscosity measurement device.

•German-made Sphygmomanometer.

•A stethoscope.

•Special bottles to save magnetic water.

•Mugs to drink magnetic water.

•Sterile Blood Lancets.

•Medical cotton.

•Medical alcohol.

•Case sheets (4).

•Measuring tape.

•Whistle.

•Test tubes.

•Football stadium.

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•Stopwatch.

4. Field Research Procedures:

3.4.1 Physical test used in research:

1. Speed test [3]

a. Test name: Speed tolerance test.

b. The purpose of the test: to measure the speed tolerance.

c. Tools used: football, whistle, tape measurement.

d. Performance Description: Determines the distance of 20 m by parallel to the sideline and indicates the starting line and finish line as shown in the form of the high start mode. The rolling player will roll the ball at the maximum speed of 20 m for the finish line, return to the starting line and thus repeats this 5 times.

e. Recording: Calculates (back and forth time and records time to approximately 1/100) per second.

2. Test of force [4]

a. Test name: Test bearing strength.

b. The purpose of the test: to measure the strength tolerance of the two men's muscles.

c. Tools used: stopwatch, whistle.

d. Performance description: When starting from squat mode, the lab jumps vertically high so that the knees extend, the feet leave the floor in each jump and the lab continues to jump for 30s.

e. Test instructions: The jump upwards and arms are extended at the abdominal level while observing the bend of the knees in squat position and given one attempt for each laboratory.

f. Recording: Records the number of jumps within 30 minutes.

3.4.2 Physiological tests:

1. Measuring hemoglobin saturation with oxygen:

The two researchers measured the saturation of hemoglobin with oxygen through an oximeter that establishes the index finger of each player from the search sample at rest and immediately after effort.

2. Blood viscosity measurement (P.C.V). [5]

The researchers measured it by mediating laboratory analyses of blood by drawing blood from the research sample at rest and immediately after effort.

•Sterilization of thumbs with sterile substance (alcohol) by a piece of cotton.

•Sterile Blood Lancets.

•Using the Hematocrit Capillaries, the red tip (painted on the walls from the inside with the anti-coagulation material EDTA), we draw the amount of blood to the level of three quarters of the tube.

•We close one end of the capillary tube with synthetic clay (clay) material.

•We place the tube with a centrifuge (Microcenter Feuge), taking into account the balancing of the capillary pipes inside the device.

•The speed of the device, the number of its cycles and the time needed to read (10,000 cycles/minute, and for five minutes.

•Using the ruler for measurement, we measure the percentage of pressurized blood cells (P.C.V), measured in percentage.

4.Blood hemoglobin (HB) measurement. [5]

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The researchers measured hemoglobin by pulling blood from the research sample at rest and immediately after effort, and the Ver micellular sample is withdrawn by cleaning By wiping it down with an alcohol-soaked piece of Ethyl-o-alcohol isopropanol (70%), then tingling the thumb with the mediation of the scalpel quickly and lightly, causing a deep wound 1_2 mm and bending the thumb and pushing the blood profusely. Then we put the hair absorbent horizontally on the drop of blood coming out of the wound and let the blood rush into the absorbent up to the required mark and the blood droplets collect in a 15 mm test tube, then put into the centrifuge

$$HB\ (g/dl) = \frac{PCV\text{-}2}{3}$$

Figure 1.

3.4.3 Exploratory experience:

The researchers conducted the exploratory experiment on a number of the 5 players from the research community themselves on Saturday, April 13,2024, at 10 a.m.

•Ensure the safety and validity of the tools used in the implementation of tests.

•Know the time each test takes.

•Find out the extent of the team's understanding of the details of the tests and how to implement them as well as how to record the results of the tests.

•Make sure the test is suited to the sample level and how well they understand and respond to it.

•Find out what constraints and disadvantages the researchers and the team face during the implementation of the tests.

•Work to overcome and avoid errors before implementing the main experiment.

3.4.4 Pre-Tests:

The researchers conducted the pre-test on the research sample on Wednesday, April 17, 2024, at Al-Zawraa Sports Club football stadium, in addition to preparing all the requirements and supplies for the tests.

3.4.5 Main Experiment:

During the implementation of the exercises in the training program, the players were prevented from drinking any non-vital water at all and relied during this period on magnetized water (vital water), as a magnetic funnel was given to each player from the research sample to restore the vitality of the water. This is done by placing the magnetic funnel on the mouth of the empty water bottle and pouring sterile water into the funnel. Once the water passes through the magnetic funnel, the physical properties of the water change and become more vital. These exercises were applied to the research sample on April 21,2024 until August 14,2024, which were characterized by continuous change in training distances with training intensity during the same training unit as is the case with the variable intensity method, as the researchers took into account.

a. These exercises were implemented in the special preparation and pre-competition stages.

b. Using the variable intensity training method with continuous effort.

c. These exercises were implemented over a period of (16) weeks with (4) training units per week for Saturday, Sunday, Tuesday and Wednesday, A total of (64) training units.

d. The duration of the training unit lasted between (70-125) minutes, the researchers aimed to develop the special endurance and raise it to the highest possible levels in the research sample.

e. The researchers took into account the principle of undulation and gradual increase in the training load.

f. The training intensity used ranged between (70 - 75%).

g. The pulse intensity used corresponding to the training intensity ranged between (120% - 150%).

h. Providing complete and sufficient quantities of magnetized water during all training units and for all members of

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the research sample.

i. The average person needs about 4 cups of water per day in normal climate and the body secretes large amounts of it through the kidneys, lungs, intestines and skin.

j. The research sample continues to drink magnetized water throughout the week for (16) weeks to magnetize all fluids in the body. Through the researchers' review of a number of studies, studies have indicated that the human body needs three months of continued drinking magnetized water to magnetize all fluids in the body.

k. Drink magnetized water before, during and after training.

1. Drink (32) cups of magnetized water two hours before starting training. Drink (21) cups of magnetized water (5-15) minutes before starting training.

2. Drink one cup (200) milliliters of magnetized water every (10-15) minutes regularly or when feeling thirsty.

3. After finishing training, the runner drinks as much magnetized water as he needs for the rest of the day.

3.4.6 Post-Tests:

The researchers, with the help of the assistant work team, conducted the post-tests on Saturday, August 17, 2024, at the Al-Zawraa Sports Club football stadium. The test was conducted under the supervision of the researchers and the assistant work team.

3.5 Statistical methods

The researchers used the following statistical systems:

a. The ready statistical package (IBM.SPSS. Ver20) to obtain the following:

b. The arithmetic mean.

c. The standard deviation.

d. The skewness coefficient.

e. The (t) test for correlated samples.

Result and Discussion

4.1 Presentation, analysis and discussion of the results of the research tests:

The test	Pre-test		Post-test		T- value	Sig	Significance
	The Arithmetic mean	Standard Deviate	The Arithmetic mean	Standard Deviate			
bear strength	25.4	0.84	32.8	2.15	8.92	0.00	Moral
Speed tolerance	26.57	0.66	21.44	0.83	22.34	0.00	Moral
HB	13.282	1.028	15.132	0.569	5.371	0.001	Moral
PCV	47.168	1.898	42.167	3.256	2.662	0.029	Moral
Oxygen saturation	92.889	2.935	97.222	1.092	1.529	0.165	Non-moral
* Significant at a significance level of (0.05) and a degree of freedom of (11).							

Table 1. *shows the arithmetic means and standard deviations of the (t) value for the pre- and post-test for the research sample individuals.*

Table (1) shows the statistical indicators of the results of the pre- and post-tests of the research variables that the research sample individuals underwent. The results showed that the values of the arithmetic mean for all variables were higher in the post-test than in the pre-test, and a significant change occurred between the two tests in favor of the post-test, as the higher the arithmetic mean, the better the level, except for the oxygen saturation scale, which indicated the presence of insignificant differences between the two tests.

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The researchers attribute the reason for the development that occurred in the post-test from the pre-test through what was presented to the exercises used in developing special physical abilities according to these exercises and according to the times specified for them in the proposed exercises. “Diversity in athletic performance is one of the basic factors for the process of balance in physical integration”. [6]

When developing the exercises, the researchers took into account the correct gradation of the training process and the performance of the required exercises, as they included more than one physical ability in the prepared training units, as (ability improves if the training also includes exercises that work to develop other physical abilities) at the same time, the processes of progress in the level of physical fitness elements are done as a result of the correct exchange between work and rest, as the load that falls on the individual leads to a temporary decline in the functional ability of the organs inside the body, and during rest the body produces a greater amount of energy than it consumes during effort.

The researchers believe that the precise handling of the components of the training sentences in a scientifically studied manner led to the development of strength endurance, speed endurance, and speed-specific strength endurance “a process of possible change in the load and rest, and to try to get the athlete to the required level”. [7]

The researchers attribute this development to the use of the variable intensity training method, which depends on alternating between effort and rest according to repetitions and groups distributed in it the times of work, rest, and change in intensity “the variable intensity training method is similar to what a soccer player does in a match, the player runs, then rests, then runs, and so on”. [8]

In the hemoglobin (HB) test, there are significant differences between the pre- and post-tests (before the effort) in favor of the post-test. There is also a good development rate with a slight increase in the hemoglobin percentage (since the increase in hemoglobin does not lead to an increase in the oxygen supply, given that the muscles are primarily responsible for the amount of oxygen consumed, and this is related to the ability of the muscles to extract the oxygen supplied to them with the blood). Thus, increasing the ability of the muscles to extract a larger amount of oxygen is more effective than increasing the volume of hemoglobin that carries oxygen to them, as the muscles can compensate for the lack of hemoglobin by increasing the extraction of oxygen. Also, the lack of hemoglobin is the main reason for the lack of physical fitness of the player, and all of this gives us an indicator for evaluating and following up on the players for the relationship between the hemoglobin percentage and physical fitness, and this becomes clear when repeating the medical examinations with an explanation of their practical results to the coach and the player to benefit in rationalizing training. [9]

The pre-competition stage led to “a change in the concentration of hemoglobin as a result of regular exercise for a certain period of time, which leads to the blood adapting to the performance of physical training. These changes include an increase in blood volume, hemoglobin volume, and red blood cells”. [10]

In the blood viscosity test (PCV), there were significant differences between the pre- and post-tests (before the effort), with small differences, but there was a slight percentage of development in favor of the post-test (and it falls within the normal limits for players because a high level of viscosity) may cause a serious disease condition. This led to a significant improvement in the players’ ability to perform physical activity as a result of the speed of blood flow and rushing quickly and in high quantities, which helped increase the delivery of oxygen-laden blood to the working organs and muscles. This is due to the effectiveness of the training method and the correctness of its application, in addition to the water that was replacing the loss from the body in a high percentage of oxygen. When water is magnetized, “it improves its solubility and increases the fluidity of the blood, as well as changing the ionic balance and biological properties in it, which positively affects human organs”. [2]

In the blood oxygen saturation test, there were random differences between the pre- and post-tests (before the effort), with good differences and a very slight rate of development (this falls within the normal range for a normal person and within the upper limits, and this is due to the increased effectiveness of the blood as a result of the union of hemoglobin at a high rate) with oxygen and the speed of its delivery to the tissues and muscles during rest and due to the absence of pressure on the heart and circulatory system, which is due to irrigating the body with magnetized water, which increases the percentage of oxygen in hemoglobin, “Magnetized water also plays a role in increasing the percentage of oxygen in hemoglobin because it is more active and vital than regular or sweetened water, as the concentration of oxygen in it is higher than regular water, and this property is important in increasing the body’s energy and raising its ability in oxygen utilization processes”. [2]

Conclusions

From the results presented, their analysis and discussion, the researchers reached the following conclusions:

Variable intensity training and irrigating with magnetized water increased the training return of the physical abilities under study, which are (strength endurance, speed endurance).

The effectiveness of magnetized water, which works to (reduce the feeling of fatigue and provides the body with energy due to the high percentage of oxygen) in this water, which works to supply hemoglobin with oxygen, thus

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leading to an improvement in the level of players' performance and the result of continuous training.

The effectiveness of magnetized water, which works to increase the ability of blood hemoglobin to absorb oxygen molecules, which increases energy levels in the body.

Irrigating with magnetized water worked to develop the physiological indicators under study, which are (hemoglobin, blood viscosity, hemoglobin saturation with oxygen).

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