

## THE EFFECT OF (HYPOXIA) EXERCISES ON WHITE BLOOD CELLS AND IMMUNE PROTEINS TO CONFRONT (COVID-19) AND SOME PHYSICAL AND SKILL VARIABLES FOR YOUNG VOLLEYBALL PLAYERS

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### Abstract

The purpose of this paper is to Preparing hypoxia exercises to raise the functional efficiency of young volleyball players, in addition identifying the effect of hypoxia exercises on the variables of white blood cells and immune proteins to confront (Covid-19) and some physical and skill variables for young volleyball players, the research community was selected, they are Al-Daghara Sports Club players participating in the Premier League for the 2020-2021 volleyball season, and their number is (12) players. They were divided in a simple random way into two experimental and control groups, with (6) players for each group. The most important conclusions are that the hypoxia exercises used are of great importance in increasing the efficiency of the volleyball player, and the hypoxia exercises used had a great and effective effect in increasing the level of indicators of the immune system, and that the hypoxia exercises contributed to raising the level of physical and skill abilities of young volleyball players.

### Introduction

The science of physiology and biochemistry related to sports training is one of the important and sober sciences that makes before us a wide horizon of accurate scientific facts of the extent of the athlete's ability and his physical and functional ability, and thus knowledge of the extent of development in the level of physical performance as a result of those physiological effects of sports training based on those sciences and the associated foundations that are about its way is to stand on the process of adaptation of the various organs of the body through the use of hypoxia exercises aimed at developing functional capabilities, considering the prevailing energy system in the game of volleyball is the anaerobic system with a greater percentage and a lesser percentage of lactic ones. In addition, the negative effects that resulted from the (Covid-19) invasion of society in general and the athlete in particular, thus affecting the physical and functional level and so that we can protect the athlete, maintain and develop his level in light of this pandemic through the use of Hypoxia exercises as sports training leads to the events of many changes, whether they are physical changes from the development of the physical characteristics of the type of physical activity practiced or internal changes that occur as a result of sports training, which include functional or chemical changes to the various body organs and according to the type of training, and among these changes that occur to the body's organs The chemical changes that occur inside the muscle cell to release the energy needed for muscular work, as the progress of the individual's athletic level depends on the extent to which these chemical changes are positive and in order to achieve adaptation to the body's organs and organs in order to face fatigue resulting from training, and among the most important of those chemical changes that are affected by training is on pellets White blood and immune proteins to counter (Covid-19), As the immune system and the immune system are highly sophisticated and self-developed means of defending the body and maintaining physical balance and organ functions in the face of risks that

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it may be exposed to and against environmental changes that do not stop at any limit and are stable in the case, and it is also a huge system and a crowd of cells inside the body at the highest level in organization, coordination, means of communication and early warning, which is responsible for memory and recording accurate information about all specifications of microbes, bacteria and viruses that invade the body and cause disease (3-3), as the effect of training on the immune system is one of the most important basic points that must be taken into account when organizing physical loads For athletes, due to the important role this device plays in resisting diseases and changes that occur in the body, including in particular (Covid-19), which may increase in the training and competition season, which leads to the player losing his level and reducing the ability of the device to protect other body systems (5-295). Hence the importance of research in the use of Hypoxia exercises to support the immune system of the players by raising the functional efficiency of the body and thus the positive impact on the total capabilities of the players, including the immune system to confront (Covid-19) and thus raising the level of physical and skill capabilities of young players in volleyball so that it is done by It provides accurate scientific data on the variables under study.

### Research problem

During the outbreak of the disease (Covid-19) and the interruption of most sports activities, whether individual or group, including the activity of volleyball, a complete interruption from the practice of the usual sports activities and exercises to maintain a constant level of physical fitness as well as the skill level, which negatively affected the functional system of the respiratory system in general And the immune system, in particular, because this immune system plays a large and important role in resisting diseases and changes that occur in the body when injuries occur and the speed of recovery from them, which may increase in the training season and competition, which leads to the player losing his level and the ability of the system to protect other body systems , and among the most important of those chemical changes that are affected by training is the immune indicators, as the immune system and the immune system are highly sophisticated and self-developed means to defend the body and maintain physical balance, practicing sports activity constantly and regularly has many benefits on the respiratory system, including, increasing pulmonary ventilation Which helps to remove the buildup of carbon dioxide.

Increase the volume of the lungs and thus increase their efficiency an increase in the capillaries surrounding the alveoli, which improves the process of gas exchange, decreases the number of breathing times from about (16) to (12) with an increase in the depth of breathing. Increases the ability to consume oxygen. The importance of the research lies in the following question: Does hypoxia have the variables of white blood cells and immune proteins to confront (Covid-19) and some indicators, physical and skill for young volleyball players.

### Research objective

- Preparing hypoxia exercises to raise the functional efficiency of young volleyball players.
- The effect of Hypoxia exercises on the variables of white blood cells and immune proteins to confront (Covid-19) and some physical and skill variables for young volleyball players.

### Research methodology and field procedures:

#### Research Methodology

The researcher used the experimental method according to the design of the two equal groups in proportion to the nature of the sample, procedures and solution to the research problem.

#### Community and sample research

The researcher worked to obtain a sample that honestly represents the research community, as the research community was chosen, namely the Al-Daghara Sports Club players participating in the Premier League for the 2020-2021 volleyball season, numbering (12) players. Players for each group with an experimental design ((pre-test for the two groups for the indicators under study)) + ((Hypoxia exercises for the experimental group)) + ((exercises approved by the trainer for the control group)) + ((post-test for the two groups)).

#### Study variables

#### Immunological (chemical) blood variables

1. White blood cell count variables (WBC, white blood cell count) - (Neu) - (Mono.-) (Eos) - (Baso).

2. Immunoproteins variants (IgG-IgM)
3. Physical variables:
  - The explosive power of the legs, the explosive power of the arms, the speed characteristic of the legs, the speed characteristic of the arms.
4. Skill variables:
  - Blocking, smash hit.

### Main experience

#### Pre- test

Pre-tests and measurements were carried out on Wednesday 12/9/2020 at nine in the morning. Venous blood samples were drawn from the players (5 ml) from each player from the research sample before training for the research sample for the two experimental and control groups so that the players are in a state of complete rest and without exercising any Physical effort, and then the players are exposed to the effort of a five-game match, after which venous blood samples are drawn from the players in the amount of (5 ml) from each player. The blood was emptied from the syringes to the numbered blood saving tubes, and each number on the tube corresponded to the player's name in the registration form. The tubes were divided into (12) tubes for pre-exertion testing and (12) tubes for post-exertion testing, numbered with the mentioned numbering, containing the anticoagulant EDTA These are used to save blood to extract white blood cell variants (WBC. Mono. Neu. Eos) and normal tubes to extract immune proteins (IgG-IgM). The same procedure is repeated for measurement after training and under the same conditions that were performed in the measurement before training and after completing the blood withdrawal process. Blood is placed in tubes and transferred to the laboratory, for the purpose of separation and extraction of blood serum (Serum) by a specialized chemical using a centrifuged device at a speed of 5000 revolutions / minute, then withdrawing blood serum (Serum) by means of a micropipette (micropipette) and placed in a test tube numbered with tube number The blood itself was preserved, then it was kept in the CoolBox until the measurements were made (the subject of the study).

**Hypoxia exercises:** The researcher prepared hypoxia exercises during the special preparation period for volleyball players, and they may be as follows:

The researcher prepared hypoxia exercises in the special preparation period, with the aim of improving volleyball players, and they included the following:

- 1- The hypoxia exercises lasted (10) ten weeks, at a rate of (3) three training units per week, for the days (Saturday, Monday, and Wednesday), bringing the total training units to (30) training units. The first experimental group was subjected to hypoxia exercises, while the other group succumbed to the trainer.
- 2- Hypoxia exercises were applied during the special preparation period.
- 3- The researcher used 1:1 ripple.
- 4- In order to ensure the safety of work, hypoxia exercises were presented to a group of experts and specialists in the science of sports training to express their opinions on its suitability for such a sample. Thus, the researchers reached the preparation of hypoxia exercises, and the exercises were applied for the period from Saturday 12/12/2020 to Saturday 20/2/2021, and the design of hypoxia exercises relied on scientific foundations in terms of:
  - Appropriateness of the content of the proposed exercises to the level and abilities of the research sample members.
  - Taking into account the purpose of preparing the proposed exercises.
  - Taking into account the appropriate formation of the training load in terms of intensity, size and comfort, and by 15 exercises, and as indicated, all exercises were performed with the players breathless.
- 5- The court is divided into three sections in length. Each player serves in three areas (right - middle - left) with the service area switched every (20 seconds) continuously during the exercise (1 d).
- 6- (6) Players standing behind the end zone to perform the skill of serving and next to each player balls after the service is executed; he runs quickly to take the defensive position and quickly returns to his place to perform the service during the exercise time (30 sec).
- 7- The court is divided into three sections in length. Each player serves in three areas (right - middle - left) with the service area switched every (20 seconds) continuously during the exercise (1 min).
- 8- Each player performs the serve and then runs quickly to touch the net and then return to the service area in succession during the exercise (75

seconds).

- 9- Divides court in half. The jump set stands in the center (3). The attacker stands in the center (4) to perform the smash hit and quickly come back behind the hurdles to jump over them at the end of the court to perform the smash hit in succession. Exercise time (40 secs).
- 10- Three balls hanging above the net (20 cm) high in a position (2-3-4) the player who hits the position (4) performs a smash hit to all positions continuously during the exercise time (15 seconds).
- 11- The jump set player stands in the position (2) the hitter stands in the position (6) to jump over the hurdles number (5) to the front attack line to perform a smash hit in my center (4-3) with continuous exercise time (50 seconds).
- 12- The player jump set stands in the center (3) and the attackers are in the center (4-2) the attackers go to perform a smash hit according to the ball's preparation, the player performs the skill block center (3) moves according to the ball during the exercise (30 sec).
- 13- A hanging ball in the center (4-2) The player stands in the center (3) when he hears the coach whistle, he goes to one of the two balls to jump and touch it with both hands to perform a block and then drop and repeat the performance in the same way as the first and then return to the first ball during the exercise (15 seconds) .
- 14- (3 players) stand behind the attack line in the center (3) in the form of two locomotives, placing poles at a distance (50 cm) from the center line in the same playing field and the distance between one person and another (50 cm) and the player jumps over the poles and performs a block during the exercise (15) Tha).
- 15- The jump set stands in the center (2) For the attacker, team (A) the attacker stands in the center (6) behind the poles to jump on them, then performs a smash hit in the center (3), then moves to the side to perform the blocking wall in the center (4). Player B reverses the performance of Player A in the exercise time (40 seconds).
- 16- Three players stand in the position (4-3-2) on the opposite side above the bench, the player prepared in the position (3) The player stands in the serve area to perform a server and then performs the skill of defending the court in (1-6-5) from an incoming ball of the players on the opposite side and then perform the skill smash hit in the center (4) Practice time (30 sec).
- 17- The player stands in the serving area to perform the overwhelming serve skill, then jumps over the poles, then moves sideways between the poles, then performs a center block (2-3), then moves behind the attack line in the center (4) to perform a straight smash hit exercise time 25 seconds.
- 18- The jump set stands in the center (3). The player stands in the serve area to perform the skill serve, then performs the smash hit from the center (1-6), then performs the quick smash hit in the center (3), then moves sideways to perform the blocking skill in the center. Position (4) and then performs a smash hit from position (3), the exercise time (30 seconds).
- 19- Team A stands the jump set in the center (4) and the attacker is in the center (2) on the offensive line. The attacker performs a smash hit, then moves to the side to perform a center block (3), then moves to the center (2) and vice versa for player B (Exercise time (30 sec).
- 20- The player stands in position (6) in the serve area, then moves at full speed to catch a falling ball from the coach in position (2), then defends the playing field in position (6) from the coach who hits the crush, then moves to center (4). ) to perform a Qatari smash hit, after which he performs the skill block from position (3) and repeats the performance with a time (45 seconds) (Tables 1,2).

#### Post-test:

Post-tests and measurements were carried out on Tuesday 23/2/2021 at nine in the morning with the same procedures that were carried out in the pre-test.

#### Presentation, analysis and discussion of the results:

Presentation and analysis of the results of the variables of white blood cells and immune proteins after exertion and some physical and skill variables of young volleyball players for the experimental and control groups

Presentation and analysis of the results of the variables of white blood cells and immune proteins after exertion and some physical and skill variables for the young volleyball players of the experimental group before and after training.

**Table 1:** A daily training unit in the special preparation stage for the players of Al-Daghara Sports Club.

Sections Of The Unit	Time (min)	Exercise number	Exercise time (second)	Rest between repetitions (Second))	Rest between groups (min)	The number of iterations of time	Number of groups	Total exercise time (min)
preparatory	15	General warm-up - special warm-up						
main	70	(3)	75	90	3- 5	3	2	21
		(5)	10	30	3- 5	5	3	16,5
		(9)	10	25	3-5	5	2	12
		(11)	30	50	3- 5	4	3	20.5
concluding	5	General calming exercises				total time: 72 min		

Training unit/second                      Number of players: 12                      Unit intensity: 85%  
 Today - Date / Monday: 12/14/2020                      Unit time: 90 min  
 Training Objective: To improve the functional capabilities of volleyball    first week

**Table 2:** A daily training unit in the special preparation stage for the players of Al-Daghara Sports Club.

Sections Of The Unit	Time (min)	Exercise number	Exercise time (second)	Rest between repetitions (Second))	Rest between groups (min)	The number of iterations of time	Number of groups	Total exercise time (min)
preparatory	15	General warm-up - special warm-up						
main	70	(4)	30	65	3- 5	4	2	17,5
		(7)	30	65	3- 5	4	2	17,5
		(12)	10	35	3-5	4	2	12,33
		(15)	75	100	3- 5	3	3	21.83
concluding	5	General calming exercises				total time:69.16 min		

Training unit/ twenty-five                      Number of players: 12                      Unit intensity: 95%  
 Today - Date / Saturday 13/1/2021                      Unit time: 90 min  
 Training Objective: Improving functional, physical and skill capabilities in volleyball Ninth week

**Table 3:** shows the means, standard deviations, and (T) value of the study variables after the effort of the experimental group before and after training.

No.	variables	Before training		After training		T value	Level sig	
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
1	white blood cell variables	WBC	9.342	1.326	10.971	1.604	7.628	0.000*
2		Neu	4.725	0.728	5.6278	0.207	6.927	0.000*
3		Mono	0.628	0.082	0.6882	0.051	8.526	0.000*
4		Eos	0.25102	0.189	0.2993	0.126	5.923	0.000*
5		Baso	0.0732	0.023	0.0857	0.009	9.927	0.000*
6	Immunoproteins	IgG	1238.426	164.378	1284.410	175.492	11.456	0.000*
7		IgM	156.239	34.638	167.614	40.193	7.287	0.000*
8	physical abilities	Explosive ability of the legs	1081.382	69.216	1343.281	20.675	7.862	0.000*
9		Explosive ability of the arms	7.281	0.5373	9.821	0.5021	20.492	0.000*
10		force Distinguished by the speed of the two legs	7.4589	0.3184	8.2016	0.08268	4.041	0.017*
11		force Distinguished by the speed of the two arms	20.100	2.5839	24.3000	1.4013	4.596	0.009*
12	skill abilities	block skill	6.200	0.7486	8.400	0.5109	4.834	0.008*
13		smash hit skill	20.300	1.637	28.500	2.725	4.436	0.011*

From Table (3) we find that the variables of white blood cells and immune proteins after effort and some physical and skill variables for young volleyball players showed that there are significant differences in the measurements between before and after training and in favor of the experimental group after training.

**Presentation and analysis of the results of leukocytes and immune proteins variables after exertion and some physical and skill variables of young volleyball players for the control group before and after training**

From table (4), we find that the variables of white blood cells and immune proteins after exertion and some physical and skill variables for young volleyball players showed that all the differences were for white blood cells, while significant differences appeared for immune proteins and some physical variables except for the force distinguished by the speed of the two legs arms and skill abilities of young volleyball players between before and after training and in favor of the control group after training.

**Presentation and analysis of the results of the variables of white blood cells and immune proteins after exertion and some physical and skill variables for young volleyball players between the experimental and control groups for the test after training.**

From table (5) variables of white blood cells and immune proteins after effort and some physical and skill variables for young volleyball players, it appeared that there were significant differences in the dimensional measurements between the experimental and control groups and in favor of the experimental.

Through the results that were presented in tables (3, 4, 5), the researchers see that the hypoxia exercises that were used on the experimental group had a significant impact on the improvement of its members compared to the control group that is under coach training. The reason is attributed to the fact that there is a scientific fact that confirms that the number of white balls returns to normal after 48 hours of making any effort, as many sources confirm that the number of white balls and the result of high effort may rise significantly, as he

**Table 4:** shows the arithmetic means, standard deviations, and (T) value of the study variables after the effort of the control group before and after training.

No.	Variables		Before training		After training		T value	Level sig
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
1	white blood cell variables	WBC	9.478	1.255	9.165	1.923	2.256	0.058
2		Neu	4.710	0.381	4.862	0.371	1.754	0.094
3		Mono	0.660	0.0863	0.656	0.110	1.529	0.097
4		Eos	0.25382	0.1570	0.2637	0.156	2.175	0.063
5		Baso	0.0764	0.034	0.0810	0.018	0.367	0.461
6	Immunoproteins	IgG	1265.411	164.271	1271.263	169.265	3.889	0.038*
7		IgM	161.513	36.453	164.527	380.726	2.783	0.040*
8	physical abilities	Explosive ability of the legs	1071.922	60.482	1187.773	51.267	3.426	0.027*
9		Explosive ability of the arms	7.1637	0.5401	8.400	0.5632	3.345	0.029*
10		force Distinguished by the speed of the two legs	7.4171	0.3739	7.8782	0.1918	3.929	0.017*
11		force Distinguished by the speed of the two arms	20.500	2.0741	22.300	1.527	2.00	0.116
12	skill abilities	block skill	6.3000	0.8337	7.100	0.736	4.000	0.016*
13		smash hit skill	20.1000	1.5802	24.5000	1.527	6.782	0.002*

**Table 5:** shows the arithmetic means, standard deviations and (T) value of the study variables after effort between the experimental and control groups after training.

No.	Variables		Before training		After training		T value	Level sig
			mean	Standard deviation	Arithmetic mean	Standard deviation		
1	white blood cell variables	WBC	9.165	1.923	10.971	1.604	6.7265	0.000*
2		Neu	4.862	0.371	5.6278	0.207	7.629	0.000*
3		Mono	0.656	0.110	0.6882	0.051	7.418	0.000*
4		Eos	0.2637	0.156	0.2993	0.126	5.682	0.000*
5		Baso	0.0810	0.018	0.0857	0.009	8.7183	0.000*
6	Immunoproteins	IgG	1271.263	169.265	1284.410	175.492	7.8392	0.000*
7		IgM	164.527	380.726	167.614	40.193	6.438	0.000*
8	physical abilities	Explosive ability of the legs	1187.773	51.267	1343.281	20.675	11.327	0.000*
9		Explosive ability of the arms	8.400	0.5632	9.821	0.5021	16.283	0.000*
10		force Distinguished by the speed of the two legs	7.8782	0.1918	8.2016	0.08268	4.155	0.015*
11		force Distinguished by the speed of the two arms	22.300	1.527	24.3000	1.4013	4.735	0.008*
12	skill abilities	block skill	7.100	0.736	8.400	0.5109	5.204	0.000*
13		smash hit skill	24.500	1.527	28.500	2.725	5.737	0.000*

confirms (Jabbar Rahima) "During periods of Rest, the number of white blood cells is about (6-8) thousand cells per (1) mm<sup>3</sup> of blood. Normal condition after about (48) hours <sup>(1)</sup>.

White blood cells are considered one of the most important indicators of the immune system of the athlete's body, but there is a difference in opinions about the changes that occur to them during training, and there is no study that proves the difference in their values after effort after training. White blood is no less important for the athlete due to the important role it plays in resisting diseases and injuries, which the player often suffers in the competition season, and thus loses his fitness and decreases his athletic level <sup>(2)</sup>.

As for the white blood cell variants, we note that the monocytes are about 5% of the total white blood cells, and their nuclei are kidney-shaped and have more cytoplasm than lymphocytes, and they are the largest white blood cells 12-17 microns, and they are formed in the marrow Bones, lymph nodes and connective tissues often migrate from the blood to the spaces between tissues, and have a high ability to devour bacteria and the remains of cells and cancer cells and remain alive for several months, while the neutrophils are the most numerous, constituting 62% of the total white blood cells live From a few hours to 3 days, spherical shape with a diameter of 12-15 microns

Its nucleus is lobed, and its cytoplasm is rich in granules of neutral dye (neutral dyes) forming the color purple. Its function is to defend the body by phagocytosis of microorganisms and foreign bodies that reach the body and has the ability to produce powerful enzymes (in their lysosomes) that break down proteins of bodies. In addition, the basophils of white blood cells are characterized by the presence of granules that are stained with basal pigments, their shape is spherical, their diameter is 11-14 microns, their nuclei are

composed of two lobes, the least number of cells 0.5% live for several hours to 3 days. They secrete heparin, which prevents blood clotting, and histamine, which is important in case of infections, while acidophilic white blood cells (Acidophils) are sometimes called eosinophils because their granules are stained with eosin with acidic pigments. It takes a red color, its number is 2.5%, its diameter is 10-12 microns, its nuclei are composed of two lobes, live 10-12 days, and they phagocytose pathogenic organisms, including protozoa and parasitic worms, and they have a role in allergic diseases, where their number increases when allergic. In addition, it helps to get rid of the foreign bodies (antigens) associated with the antibodies (antibodies) <sup>(3)</sup>.

Thus, the effect of sports training on white blood cells, sports activity leads to some quantitative changes in white blood cells as well as in its different types, and these temporary changes may look similar to what happens in pathological cases, and the degree of these changes varies depending on the type of physical load in terms of size and intensity And the reason for this total increase of white blood cells is due to the blood coming out during physical activity from the blood-forming organs and from the internal organs in which the blood content exceeds cells compared to the peripheral blood.

Thus, the effect of sports training on white blood cells, sports activity leads to some quantitative changes in white blood cells as well as in its different types, and these temporary changes may appear similar to what happens in pathological cases, and the degree of these changes varies depending on the type of physical load in terms of size and intensity And the reason for this total increase of white blood cells is due to the blood leaving during physical activity from the blood-forming organs and from the internal organs in which the blood content is higher than the cells compared to the peripheral blood the

changes to increase the quality of white blood cells go through three stages:

A - The lymphocytic phase.

B-Neutrophilic Phase

C - Intoxication Phase

These quantitative changes are related to the degree of physical load intensity and the level of physical fitness of the player.

A- The first stage: the lymphocytic stage:

This stage is characterized by a non-significant increase in white blood cells (from 1 thousand to 12 thousand in mm<sup>3</sup>). This increase is noted as a result of the increase in white blood cells of the lymphocyte type, and it is observed after 10 minutes from the beginning of physical activity

B- The second stage: Nitrophilic:

It is characterized by an increase in the number of white blood cells until it reaches 16-1 thousand mm<sup>3</sup>, as a result of the increase in neutrophil cells, among which appear still small cells, and at the same time, eosinophils and lymphocytes decrease. This stage appears clearly after the start of the muscular work of high intensity, one to two hours.

C - The third stage: the stage of Intoxication:

This stage is characterized by a very large increase in the number of white blood cells until it reaches 30-50 thousand in 1 mm<sup>3</sup>, and the number of small balls increases and the number of lymphocytes decreases, and the eosinophils disappear, and this stage appears after muscle activity of high intensity for a long time, and the appearance of this third stage indicates the arrival of the player to stress<sup>(4)</sup>.

As for the immune proteins IgG, IgM, the researchers see the reason for the significant differences of the experimental group in that the hypoxia exercises that worked to raise the functional efficiency of volleyball players. As sports training is one of the most important things that work to increase the efficiency of the work of the functional body systems that affect the cells of the immune system, the immune responses are strengthened during moderate training, and they are inhibited after training with high intensity and long duration. Regular and continuous physical exercise on the immune cells, and thus the effect is reflected on the immune system, including the immune proteins IgG, IgM. If we can conclude that the frequency of the disease increases due to an imbalance between what the individual can bear in terms of physical burdens and the ability of the immune system, and pregnancy Excess, competition, mental and psychological burdens, and wrong nutrition are all causes of stress in the immune system, and taking into account individual differences in rationing loads and training on their basis with attention to the recovery phase and its appropriate means for the immune system and attention to the player's daily behavior and appropriate balanced nutrition is one of the best means to protect the immune system and prevention of diseases<sup>(5)</sup>.

While the researchers see the reason for the differences for the physical variables (the explosive power of the legs, the explosive power of the arms, force distinguished by the speed of the two legs, force distinguished by the speed of the two arms) due to their use of hypoxia exercises, which was focused on developing Muscular strength, as well as to increase the speed of the players, and this increase in strength and speed is imposed by the nature of performing the prepared exercises and to serve the objectives of the research, in which light resistances or body weight are used and at a high speed of performance, as (Edmund R Burke) sees that "training using light weights Which is characterized by a high ability affects different parts of the strength and speed curves, while traditional training with heavy weights increases the maximum strength of the players, and training conducted at high speed leads to the speed of skill performance to a large extent more than traditional training with heavy weights"<sup>(6)</sup>, these exercises were targeting the muscle based on its work and function. Most of the exercises were in line with the goals of the movement and had a significant impact on developing explosive ability and strength. They have speed, which are important abilities in the game of volleyball because they share most of the motor skills and therefore have an effective impact on the success of those motor skills.

The researchers believe that physical abilities are affected by hypoxia exercises used, as they play an important and prominent role in the basic characteristics of the components of physical load that characterize the game of volleyball in particular, and what this game contains of several different situations and situations of playing style such as smash hit and block, which are among the decisive offensive skills Through the quick smash hit and jumping up from the movement to do these skills and in the speed of moving the balls and the speed of running to do the skill performance and many other cases that the player needs in the matches and given the importance of this type of strength, there must be enough time to develop force distinguished by the speed of the two legs and arms within the training unit, and then a qualified player

is acquired to compete in the competitions, in addition to being a volleyball player who needs high physical numbers in which the focus is on speed and strength because it is not possible to reach the explosive power and distinctive strength Speed unless there is a high muscular build and a great motor speed, so the explosive power and speed characteristic is an ability that belongs to the muscles of the body more than others, the volleyball player mobilizes the largest possible amount of muscle fibers by means of nerve transmissions sent from the brain through the spinal cord with nerves Kinetic and neuromuscular communication (motor units) i.e. the connection of a motor nerve with a group of muscle fibers is the best achievement, as the motor unit "is the connection of a nervous unit with a muscle unit"<sup>(6)</sup>.

Also, the use of hypoxia exercises helped to develop these physical abilities by shortening the duration of muscle contraction and thus increasing the resulting muscle strength, which leads to a higher rate of contraction, as well as the greater the compatibility between the muscles participating in the motor performance on the one hand and the corresponding muscles On the other hand, it increased the production of muscle power and the speed of stimulating the muscle fibers to perform a rapid muscle contraction, and this contributed to the development of the explosive ability and the force characterized by speed clearly, as (Mufti Ibrahim) mentioned that the basic methods for developing the force characterized by speed are<sup>(7)</sup>. :-

- Increasing the rates of the resistors used with a slight reduction in performance speed.
- Increasing the average used speeds with a slight reduction of the resistances.
- The connection between the two previous methods.

While the significant differences appeared for the skill variables (blocking, smash hit) to the use of hypoxia exercises that contain a set of offensive skill exercises related to the performance and physical abilities of the volleyball player.

And it contributed greatly to the process of linking physical abilities and offensive skills, which is one of the requirements for the success of performing these skills quickly and with extreme accuracy, as well as the principle of diversification and change that researchers used in addition to continuous repetition and in a scientific manner contributed greatly to the development of those offensive skills, and this was confirmed by (Magill ) when he said, "The diversification of exercise experiences and their organization and diversity in movement will increase the experience of the players and increase the player's ability to perform the skill better"<sup>(8)</sup>. These exercises are in accordance with the characteristic of the game and the nature of offensive skills.

The researchers also believe that the reason for the development that appeared in favor of the members of the experimental group is due to the compound hypoxia exercises that were applied and similar to the playing cases of offensive skills characterized by the presence of the same motor direction of the offensive skills (block, smash hit) that performed during the competition had an effect Positively and importantly in the development of those skills, and also that the reason for the development in the skill of the wall of blocking and crushing beating is attributed by the researchers to the players reaching a state of mastery to perform this skill, and this mastery came through the use of hypoxia exercises, which are compound exercises, which were a mixture of physical and skill exercises that were It has a significant impact on the development of the experimental group.

Thus, hypoxia exercises have achieved the goal of their application in training, as they have achieved a great development of offensive block skills and smash hit skill. The point is with the least possible effort." The result of the match depends on the team's success in accuracy, and that all the skills that lead to the cooperation of the team members in implementing the plans are only preparation to achieve one goal, which is to implement the best and safest conditions in order to find an appropriate situation to end the attack process accurately high, stopping and smooth"<sup>(9)</sup>.

## Conclusions and Recommendations

### Conclusions:

- The hypoxia exercises used are of great importance in increasing the efficiency of the volleyball player.
- The hypoxia exercises used were highly effective and effective in increasing the level of immune system indicators.
- The hypoxia exercises contributed to raising the level of physical and skill abilities of young volleyball players.

### Recommendations:

- The necessity of using hypoxia exercises that are consistent with the

prevailing energy system in volleyball.

- Follow the accurate scientific means and methods when developing training programs for volleyball players.

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