Sys Rev Pharm 2020;11(12):515-519
A multifaceted review journal in the field of pharmacy

A Proposed Training Program and Its Effect on Muscle Strength Responses and Some Physiological Variables for Volleyball Beginners

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ABSTRACT

Sports training methods have evolved tremendously over the past years, so that they become suitable for players, and the coach has been constantly following up on everything new in the field of training in order to be able to provide the best and best thing in this field and raise the level and performance of his players. From this standpoint, sports training can be viewed as a process in which different training methods and means are developed and used with the aim of changing the trainee's condition according to a pre-determined goal.

Research objective: The research aims to identify the proposed training program and its effect on muscle strength responses and some physiological variables for Junior volleyball.

Research hypotheses: There are statistically significant differences between the pre and post measurement of the experimental group in some responses to muscle strength and some physiological variables in favor of the post measurement. There are statistically significant differences between the two dimensions of the experimental and control groups in some muscle strength responses and some physiological variables in favor of the experimental group

The research sample: The research sample was deliberately chosen from among the volleyball juniors registered with the Egyptian Volleyball Federation, and the total number of the research sample reached (25) volleyball juniors. The main research sample (20) youngsters were divided into two equal groups, one experimental and the other controlling, each of them (10) juniors, and the two researchers conducted homogeneity in height, weight, chronological age and training age

Conclusions: In light of the objectives and hypotheses of the research, within the limits of the sample, and based on the results of the statistical treatments, it was possible to conclude that:

The simultaneous training program has proven effective in improving right-hand grip strength, left-hand grip strength, leg muscle strength, back muscle strength, and oblique prone, arm bending and shuttle running 5 x 55 meters

The simultaneous training program has proven effective in improving the volume of exhaled air per minute during exertion, the number of breaths per minute during exertion, the volume of inhalation air at one time, the percentage of oxygen in the air of oxygen in the exhalation, the percentage of carbon dioxide in the exhalation, the maximum absolute oxygen consumption and the maximum oxygen consumption Relative volume of CO2 produced per minute, respiration factor, heart rate, oxygen pressure, pulmonary ventilation, and respiratory fitness factor.

Keywords: Sports training, Muscle Strength, Volleyball Beginners, Muscle Responses, Physiological Variables

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INTRODUCTION

Sports training methods have evolved tremendously over the past years, so that they become suitable for players, and the coach has been constantly following up on everything new in the field of training in order to be able to provide the best and best thing in this field and raise the level and performance of his players.

From this standpoint, sports training can be viewed as a process in which different training methods and means are developed and used with the aim of changing the trainee's condition according to a pre-determined goal.

Also, the athlete's requirements for strength and endurance differ according to the nature of the activity practiced. Some sports require the muscle strength component to a greater degree than the endurance component, and others require the muscular endurance component with a greater degree of muscle strength, and the majority need the two components together with the same degree and importance. These sports are volleyball.[1]

As the performance in volleyball includes many situations that require the player to have the distinctive strength with speed, as well as the possibility of adding additional times in the event of a tie, which requires another type of strength, which is carrying strength until the player performs the match, and its additional times with the required physical competence.[2]

We can notice from the foregoing that the elements of endurance and strength are considered one of the main requirements in volleyball, so all sports training programs must include the development of these two elements, due to their connection to the nature and level of performance. To ensure the effectiveness of any type and method of training, this must be done by ensuring the maximum physiological benefit possible.[3]

Laura Hokka (2011) [4] believes that some athletes think that adding aerobic endurance training to strength training may bring him the double gains from strength training and endurance training at the same time of training.

Aagaard & Andersen (2010) [5] add that simultaneous training is the combination of endurance training (aerobic or anaerobic) with muscle strength training in the same training unit or in isolated training forms within the training program (a training unit for resistance training followed by a training unit for endurance training) Or (a training week for resistance training followed by a training week for endurance training), or dividing the entire program and evenly in time between resistance training and endurance training.

Also, Kravitz (2004) [6] points out that the question that has been the most coaches in the past is which one to start with? Endurance training or strength training, and research and studies dealing with this aspect have shown the necessity to start with resistance training first, because starting with endurance training negatively affects muscle strength gains due to the fact that endurance training causes feelings of fatigue early, and thus the player's inability to continue performing Strength training.

By looking at the international network of information (the Internet) and counting the studies that dealt with simultaneous training, the researchers noted within the limits of their knowledge that they did not address the field of volleyball, in addition to the existence of a scientific debate that still exists regarding the extent of benefits gained from combining the two methods together under the name of simultaneous training, where In this regard, [7] points to the presence of inconsistencies in the results of studies dealing with the gains of simultaneous training, as some studies indicate its importance in developing physical fitness components, such as the study of Jackson et al., Jackson, et al. (2007) [8] and others argue that combining endurance training with muscle strength training affects muscle strength output if it is compared to strength training separately, such as the study of Bastiaans et al. (2001) [9], and Paton & Hopkins (2005) [10] study. The difference in results is due to the different nature of the training programs implemented in terms of intensity, frequency and rest periods, and the goal of applying the simultaneous training.[11]

Leveritt and others (2000) [12] pointed out that we still need to conduct more scientific research in order to identify the physiological and physical adaptations resulting from the practice of simultaneous training.

RESEARCH OBJECTIVE

The research aims to identify the proposed training program and its effect on muscle strength responses and some physiological variables for Junior volleyball.

Research hypotheses

1. There are statistically significant differences between the pre and post measurement of the experimental group in some responses to muscle strength and some physiological variables in favor of the post measurement.
2. There are statistically significant differences between the two dimensions of the experimental and control groups in some muscle strength responses and some physiological variables in favor of the experimental group.

RESEARCH METHODOLOGY

The researchers used the experimental method using the experimental design with two groups, one experimental and the other controlling with pre and dimensional measurements, due to its suitability to the nature of the research.

The research sample:

The research sample was deliberately chosen from among the volleyball juniors registered with the Egyptian Volleyball Federation, and the total number of the research sample reached (25) volleyball juniors. The main research sample (20) youngsters were divided into two equal groups, one experimental and the other controlling, each of them (10) juniors, and the two researchers conducted homogeneity in height, weight, chronological age and training age, and Table (1) illustrates this.

Table 1. Homogeneity of the research sample in height, weight and age and training age.

N = 25

N	statement / Variables	measuring unit	The mean	Standard deviation	Mediator	Twist Coefficient
1	Height	cm	*185.16*	6.06±	*183.11*	1.01
2	weight	kg	*71.47*	5.51±	*69.78*	0.92
3	age	year	*15.89*	1.34±	*15.30*	1.32
4	training age	number	4.68	2.16 ±	4.22	0.64

It is evident from Table (1) that the values of the torsion coefficient are between ± 3, indicating the homogeneity of the research sample.

Data collection tools and means

First: devices and tools used in the research

- Rstameter device for measuring height
- Medical scale calibrated to measure weight
- tape measure
- Medicine balls
- Swedish seats
- Boxes of different heights
- Multi gym equipment (multi gym)
- Different weights.
- JAEGER Oxycon delta device to measure the variables of the respiratory circulatory system (Fig. 1).
- Dynamometer to measure static muscle strength.

Second - The tests used in the research: Attachment (1)

1- JAEGER Oxycon delta test to measure respiratory circulatory system variables
2- The strength endurance test of the arm muscles.
3- Test the mechanical strength of the leg muscles with maximum repetition.
4- Test the static strength of the leg muscles.
5- Static strength test of back muscles.

Exploratory study

The two researchers conducted an exploratory study from 5/16/2019 to 5/6/2019 on a sample of (5)

emerging from the research community sample and from outside the basic research sample with a view.

- Determine the time that tests can take.
- Verify the validity of the devices used for measurement.
- Identifying the readiness of the research sample to undergo the conditions of conducting the experiment.
- Identify any obstacles and try to avoid them.
- Finding the best arrangement for taking measurements.

Suggested training program

The proposed program, using simultaneous training, aims to develop the variables of the respiratory circulatory system and muscular strength in volleyball youth under 16 years of age.

Foundations for building the proposed training program

- Taking into account the principle of diversity in performing the exercises within the training unit so that the young person does not feel bored and monotonous.
- The selected contents are suitable for the dental stage.
- Follow the two principles of gradation from easy to difficult and from simple to complex.
- Be guided by the results of previous studies when developing the program.

Characteristics of the program contents

- Fixing the daily application time for the research experiment with (60) minutes during the daily training unit for a period of (8) weeks, at (3) units per week, with a total of (24) training units.
- Using the circular training method when implementing the program with interval periods of 60-90 seconds
- Use the continuous load method to develop pneumatic endurance.
- pulse rate as a means of determining the intensity of physical exertion.
- Starting a resistance exercise first, followed by a specific aerobic exercise (especially for volleyball).
- Taking into account the manifestations of stress and fatigue in the nascent during the performance.

Time distribution of the proposed training program

- Physical preparation (warm-up). (5) BC
- Muscle lengthening. (10) BC
- Concurrent training. (40) QC (20S resistance training) followed by (20Q pneumatic endurance drill)
- Calm down and wrap up. (5) BC

Steps to implement the research

Pre-measurements

Pre-measurements were made in the period from 6/6 to 8/6/2019 according to the following order:

(6/6/2019)

- Respiratory circulatory system variables test. (7/6/2019)
- Physical exams.

Executing the research experiment

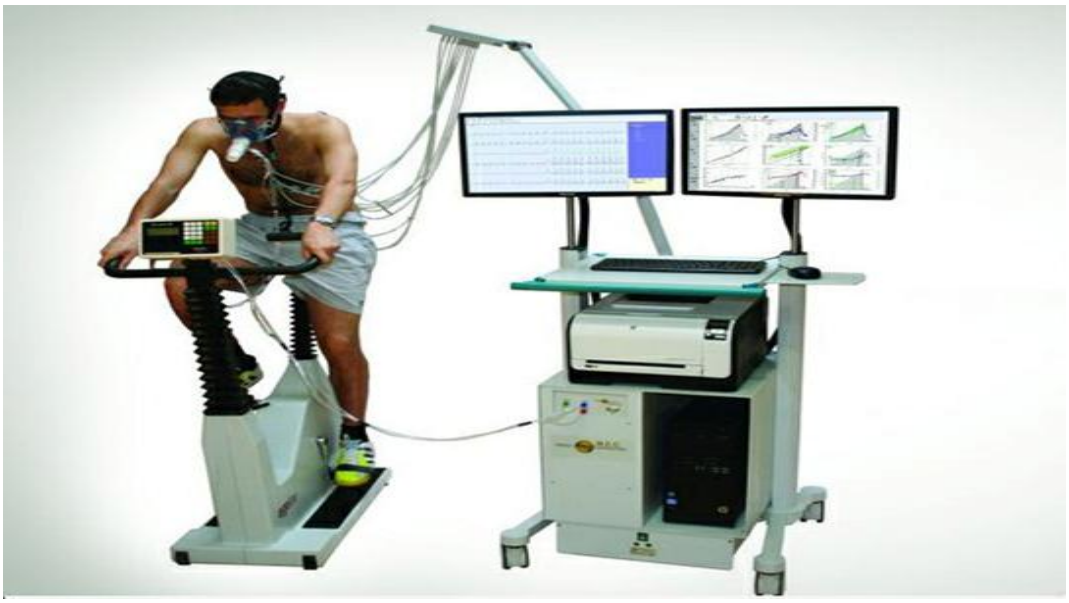
The units of the proposed training program were implemented in the period from 6/10 to 4/8/2019 for the members of the experimental group, not the control group.

Dimensional measurements

Dimensional measurements were made in the period from 5/8 to 7/8/2019, in the same order of pre-measurements.

Statistical processors: The statistical treatment plan for the primary data included:

- SMA.
- standard deviation.
- Pearson Correlation Coefficient.
- coefficient of torsion.



- T-test.

Figure 1 the JAEGER Oxycon delta test to measure respiratory circulatory system variables.

Presentation and discussion of results

First, display the results

Table 2. The significance of the differences between the mean of the previous and post measurements of the children of the control group in the physical tests.

N = 10

statement / Variables	Measuring unit	previous		post		Averages Difference	T value
		m	p	m	p		
Right Fist Force	kg	22.3	2.6	24.9	3.4	2.6	1.65
North fist strength	kg	21.15	1.9	23.48	2.6	2.33	1.15
The strength of the two leg muscles	kg	78.24	3.5	84.36	5.6	6.12	*4.03
Back muscle strength	kg	74.3	4.6	80.01	3.2	5.71	*3.17
Bend of the arms obliquely	number	12.7	1.9	14.3	1.6	1.6	*2.81
Shuttle run 5 x 55 meters	s 10/1	69.52	2.57	67.11	2.08	2.41	0.97

T value at the level of 0.05 = 2.09

Table (2) shows that there are statistically significant differences between the pre- and post-measurement of the control group in the variables of the strength of the muscles of the legs, the strength of the back muscles and the oblique prone flexion of the arms, and the absence of statistically significant differences between the pre- and post-measurement of the control group in the variables of grip strength and the strength of the grip north and running Shuttle 5 x 55 meters.

Table 3. The significance of the differences between the averages of the pre and post measurements for the juniors of the control group in device variants JAEGER Oxycon delta.

N = 10

statement / variable	Measuring unit	Previous		post		Averages difference	T value
		M	P	M	P		
The volume of air you exhale per minute during exertion	L / s	53.45	3.91	57.13	4.8	3.68	*2.59
The number of times of breathing per minute during exertion	Number / s	38.89	5.08	36.14	2.1	2.75	*2.18
The volume of inhale air at one time	Liter	1.41	0.46	1.82	0.36	0.41	*3.06
The percentage of oxygen in the air of oxygen on the exhale	L / s	5.23	1.92	4.36	1.12	0.87	1.71
The percentage of carbon dioxide in the exhalation	L / s	3.27	0.77	3.76	0.58	0.49	*2.21
Absolute maximum oxygen consumption	L / s	3.31	0.23	3.72	0.36	0.41	*4.18
Maximum relative oxygen consumption	Milliliters / kg / s	0.48	0.2	0.92	0.29	0.44	*5.44
The volume of carbon dioxide produced per minute	L / s	0.65	0.19	0.74	0.11	0.09	1.79
Respiration coefficient	L / s	0.94	0.18	1.04	0.09	0.1	*2.17
Heart rate	Pulse / s	148.15	8.63	154.6	9.1	6.45	*2.24
Oxygen pressure	Milliliter / pulse	268.08	8.95	276.1	14.2	8.02	1.08
Pulmonary ventilation	L / s	1.89	0.22	2.01	0.26	0.12	1.54
Respiratory fitness factor	Milliliters / kg / s	11.68	4.25	13.24	5.28	1.56	1.00

T value at the level of 0.05 = 2.09

Table (3) shows that there are statistically significant differences between the pre and post measurement of the control group in the variables of the volume of exhaled air per minute during exertion, the number of breaths per minute during exertion, the volume of inhalation air at one time, the percentage of carbon dioxide in the exhalation and the maximum absolute oxygen consumption And the maximum relative oxygen consumption, respiration coefficient and heart rate, and no statistically significant differences between the pre and post measurement of the control group in the variables of the percentage of oxygen in the air of oxygen in the exhalation, the volume of carbon dioxide produced per minute, oxygen pressure, pulmonary ventilation and the respiratory fitness factor.

Table 4. The significance of the differences between the means of the pre and post measurements for the juniors of the experimental group in the physical tests.

N = 10

statement / variable	Measuring unit	previous		post		Averages difference	T Value
		m	p	m	P		
Right Fist Force	Kg	23.15	2.1	28.24	3.21	5.09	*5.78
North fist strength	Kg	20.19	2.3	25.34	3.6	5.15	*5.26
The strength of the two leg muscles	Kg	80.16	4.6	92.67	6.3	12.5	*6.99
Back muscle strength	Kg	75.04	3.21	84.71	4.6	9.67	*7.51
Bend of the arms obliquely	Number	13.12	1.3	17.8	1.7	4.68	*9.53
Shuttle run 5 x 55 meters	1/10 s	68.78	3.11	63.11	2.57	5.67	*4.68

T value at the level of 0.05 = 2.09

Table (4) shows that there are statistically significant differences between the pre- and post-measurement of the experimental group in the right-hand grip strength, the north fist strength, the strength of the leg muscles, the strength of the back muscles, the oblique extension, bending the arms, and the 5 x 55meter shuttle run.

Table 5.

The significance of the differences between the means of the pre and post measurements of the experimental group juniors in device variants JAEGER Oxycon delta.

N = 20

statement / variable	**Measuring Unit**	**previous**		**post**		**Averages difference**	**T Value**
		m	p	m	p		
The volume of air you exhale per minute during exertion	L / s	55.11	3.41	61.31	4.2	6.2	*4.99
The number of times of breathing per minute during exertion	Number / s	41.13	4.12	33.54	3.4	7.59	*6.19
The volume of inhale air at one time	Liter	1.63	0.52	2.23	0.41	0.6	*3.95
The percentage of oxygen in the air of oxygen on the exhale	L / s	6.16	1.98	4.93	0.87	1.23	*2.48
The percentage of carbon dioxide in the exhalation	L / s	3.42	0.23	3.98	0.18	0.56	*8.36
Absolute maximum oxygen consumption	L / s	3.51	0.68	4.12	0.51	0.7	*3.59
Maximum relative oxygen consumption	Milliliters / kg / s	0.59	0.3	1.4	0.62	0.81	*5.13
The volume of carbon dioxide produced per minute	L / s	0.73	0.14	0.86	0.09	0.13	*3.41
Respiration coefficient	L / s	1.01	0.24	1.14	0.01	0.13	*2.36
Heart rate	Pulse / s	152.14	7.69	161.2	8.3	9.06	*3.51
Oxygen pressure	Milliliter / pulse	273.2	12.08	286.4	11.6	13.2	*3.44
Pulmonary ventilation	L / s	1.97	0.18	2.43	0.23	0.46	*6.87
Respiratory fitness factor	Milliliters / kg / s	13.21	3.56	17.34	2.64	4.13	*4.06

T value at the level of 0.05 = 2.09

Table (5) shows that there are statistically significant differences between the pre and post measurement of the experimental group in the volume of exhaled air per minute during exertion, the number of times of breathing per minute during exertion, the volume of inhalation air at one time, the percentage of oxygen in the air of oxygen in the exhalation and the percentage of carbon dioxide in Exhalation, maximum absolute oxygen consumption, maximum relative oxygen consumption, volume of carbon dioxide produced per minute, respiration factor, heart rate, oxygen pressure, pulmonary ventilation, and respiratory fitness factor.

Table 6. The significance of the differences between the mean of the post measurements of the juniors of the experimental and control group in the physical tests.

N = 20

statement	Measuring	Experimental	Control	Averages	T

variable	unit	m	p	m	p	difference	Value
Right Fist Force	Kg	28.14	3.21	24.9	3.4	3.34	*4.40
North fist strength	Kg	25.34	3.6	23.48	2.6	1.86	*2.58
The strength of the two leg muscles	Kg	92.67	6.3	84.36	5.6	8.31	*6.08
Back muscle strength	Kg	84.71	4.6	80.01	3.2	4.7	*5.17
Bend of the arms obliquely	Number	27.8	1.7	24.3	1.6	3.5	*9.24
Shuttle run 5 x 55 meters	1/10 s	63.11	2.57	67.11	2.08	4.00	*4.39

T value at the level of 0.05 = 2.01

Table (6) shows that there are statistically significant differences between the post measurement of the experimental and control groups in the variables of the right grip strength, the north fist strength, the strength of the leg muscles, the strength of the back muscles, the flexion of the arms, and the shuttle running 5 x 55 meters.

Table 7. The significance of the differences between the averages of the junior post measurements experimental and control group in JAEGER Oxycon delta device variants.

N = 20

statement / variable	Measuring Unit	Experimental		Control		Average diff	T value
		م	ع	م	ع		
The volume of air you exhale per minute during exertion	L / s	61.31	4.2	57.13	4.8	4.18	*4.04
The number of times of breathing per minute during exertion	Number / s	33.54	304	36.14	2.1	2.6	*4.01
The volume of inhale air at one time	Liter	2.23	0.41	1.82	0.36	0.41	*4.63
The percentage of oxygen in the air of oxygen on the exhale	L / s	4.93	0.87	4.36	1.12	0.57	*2.48
The percentage of carbon dioxide in the exhalation	L / s	3.98	0.18	3.76	0.58	0.22	*2.23
Absolute maximum oxygen consumption	L / s	4.21	0.51	3.72	0.36	0.49	*4.84
Maximum relative oxygen consumption	Milliliters / kg / s	1.4	0.62	0.92	0.29	0.48	*4.32
The volume of carbon dioxide produced per minute	L / s	0.86	0.09	0.74	0.11	0.12	*5.21
Respiration coefficient	L / s	1.14	0.01	1.04	0.09	0.1	*6.81
Heart rate	Pulse / s	161.2	8.2	154.6	9.1	6.6	*3.32
Oxygen pressure	Milliliter / pulse	286.4	11.6	276.1	14.2	10.3	*3.46
Pulmonary ventilation	L / s	2.43	0.23	2.01	0.26	0.42	*7.45
Respiratory fitness factor	Milliliters / kg / s	17.34	2.64	13.24	5.28	4.1	*4.28

T value at the level of 0.05 = 2.01

Table (7) shows that there are statistically significant differences between the post measurement of the experimental and control groups in the variables of the volume of exhaled air per minute during exertion, the number of breaths per minute during exertion, the volume of inhalation air at one time, the percentage of oxygen in the air of oxygen in the exhalation and the proportion of carbon dioxide In exhalation, maximum absolute oxygen consumption, maximum relative oxygen consumption, volume of carbon dioxide produced per minute, respiration coefficient, heart rate, oxygen pressure, pulmonary ventilation, and respiratory fitness coefficient for the benefit of post measurement of the experimental group.

Second - Discussing the results

Discussing physical exams

Table No. (2) shows that there are statistically significant differences between the pre and post measurement of the control group in the variables of the strength of the muscles of the legs, the strength of the back muscles and the oblique prone flexion of the arms, and the absence of statistically significant differences between the pre and post measurement of the control group in the variables of grip strength and the strength of the grip north and running Shuttle 5 x 55 meters.

Table (4) shows that there are statistically significant differences between the pre and post measurement of the experimental group in the strength of the right grip, the force of the north fist, the strength of the leg muscles, the strength of the back muscles, the oblique extension, bending the arms, and the 5 x 55meter shuttle run.

Table (6) shows that there are statistically significant differences between the post measurement of the experimental and control groups in the variables of the right grip strength, the north fist strength, the strength of the leg muscles, the strength of the back muscles, the flexion of the arms, and the 5 x 55 meters shuttle run.

The researchers attribute this to the effect of the proposed program using simultaneous training in improving the physical variables under study.

The researchers believe that muscle strength in its various forms, including maximum muscle strength,

muscle capacity and endurance force, are considered one of the most important components of muscular fitness for volleyball players, where players must continue to perform passing, correction, dribbling, jumping and running during the match with the same strength and without fatigue, and this will only happen if there is an appropriate level. Of strength and endurance of strength.

Discussing the respiratory circulatory system tests on the JAEGER Oxycon delta device

Table (3) shows that there are statistically significant differences between the pre and post measurement of the control group in the variables of the volume of exhaled air per minute during exertion, the number of breaths per minute during exertion, the volume of inhalation air at one time, the percentage of carbon dioxide in the exhalation and the maximum absolute oxygen consumption And the maximum relative oxygen consumption, respiration factor and heart rate, and no statistically significant differences between the pre and post measurement of the control group in the variables of the percentage of oxygen in the oxygen air in the exhalation, the volume of carbon dioxide produced per minute, the oxygen pressure, the pulmonary ventilation, and the respiratory fitness factor.

Table (5) shows that there are statistically significant differences between the pre and post measurement of the experimental group in the volume of exhaled air per minute during exertion, the number of times of breathing per minute during the effort, the volume of inhalation air at one time, the percentage of oxygen in the air of oxygen in the exhalation and the percentage of carbon dioxide in Exhalation, maximum absolute oxygen consumption, maximum relative oxygen consumption, volume of carbon dioxide produced per minute, respiration factor, heart rate, oxygen pressure, pulmonary ventilation, and respiratory fitness factor.

It is evident from Table (7) that there are statistically significant differences between the post measurement of the experimental and control groups in the variables of the volume of exhaled air per minute during exertion, the number of times of breathing per minute during the effort, the volume of inhalation air at one time, the percentage of oxygen in the air of oxygen in the exhalation and the proportion of carbon dioxide In exhalation, maximum absolute oxygen consumption, maximum relative oxygen consumption, volume of carbon dioxide produced per minute, respiration factor, heart rate, oxygen pressure, pulmonary ventilation, and respiratory fitness factor.

The two researchers believe that although volleyball is characterized by anaerobic energy style, it is necessary that the level of aerobic endurance reaches a degree that allows volleyball players to resist fatigue during the time of the match, and also helps to provide the necessary oxygen to speed recovery of recovery during the match or training, and also reduces the effect of fatigue due to lack of oxygen. Hence, the level of endurance in volleyball is based on the interrelationship between the aerobic and anaerobic capacity, whereby aerobic endurance builds the basis for the development of anaerobic capacity.[13]

In this regard, Hickson and others [8] confirm that aerobic endurance training within simultaneous training works on the occurrence of remarkable adaptations, the most important of which is the increase in the maximum oxygen consumption.

Bassett, & Howley (1997) [14] assert that the improvement in respiratory function variables (respiratory circulatory system) is due to an increase in the number and size of mitochondria (energy houses) within muscle cells due to their association with an increase in some enzymes, which affects the increase in muscle requirements in Obtaining the necessary oxygen for energy production, which leads to an improvement in the functions of the respiratory circulatory system to meet these requirements.[15]

Leveritt, et al. (1999) [16] that the improvement in respiratory circulatory system functions as a result of simultaneous training performance is due to the decreased heart rate resulting as an adaptation to aerobic endurance exercises that do not require maximum speed or maximum strength for performance but need to continue performing for a longer period, which results in wear and tear. Fast muscle glycogen in trainees.[17]

CONCLUSION

In light of the objectives and hypotheses of the research, within the limits of the sample, and based on the results of the statistical treatments, it was possible to conclude that:

- The simultaneous training program has proven effective in improving right-hand grip strength, left-hand grip strength, leg muscle strength, back muscle strength, and oblique prone, arm bending and shuttle running 5 x 55 meters
- The simultaneous training program has proven effective in improving the volume of exhaled air per minute during exertion, the number of breaths per minute during exertion, the volume of inhalation air at one time, the percentage of oxygen in the air of oxygen in the exhalation, the percentage of carbon dioxide in the exhalation, the maximum absolute oxygen consumption and the maximum oxygen consumption Relative volume of CO2 produced per minute, respiration factor, heart rate, oxygen pressure, pulmonary ventilation, and respiratory fitness factor.

RECOMMENDATIONS

- Application of the proposed training program for volleyball juniors
- Conducting more studies dealing with the effect of simultaneous training on other sports and on different samples
- Conducting more studies dealing with the impact of simultaneous training on other forms of volleyball training.

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