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Using some training methods to help improve some functional variables for tennis players

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ABSTRACT

The study aimed to identify the effect of some training aids in the development of some functional variables of tennis players, the researcher used the experimental method to suit the nature of the problem, and the research sample was (12) players from the advanced players in a deliberate manner, and the researcher used several methods, tools and tests, the most important of which was the use of the continuous training method, using some appropriate training methods to improve the adequacy of the respiratory system and important variables. After conducting the tests and obtaining the results, they were treated statistically, and in response to this, the researcher reached several conclusions and recommendations, the most important of which were: - There is a clear effect of the proposed tools in improving the functional efficiency of the circulatory and respiratory systems, andthe study showed a noticeable effect of the auxiliary tools in improving the functional variables, andthe recommendations were the most important of them: - The use of these tools on the court to gain time in the training of the players of tennis. Adopting other training methods with the proposed method for better development of the circulatory and respiratory systems.

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1-1 Introduction and Importance of the Research:

Sports training is one of the most difficult tasks assigned to coaches in all fields of sports training, and the game of tennis is one of the events that needs to be applied to the training curricula because of its high functional and physical requirements from its practitioners, hence the game of tennis needs an athlete with high physical and functional competence with special specifications in terms of functional variables and the adequacy of the circulatory and respiratory systems.

Special endurance is important for athletes, especially for the circulatory and respiratory systems, because this game requires the performance of physical effort and high efficiency without fatigue, and this performance comes as a result of the development in the work of the internal systems of the player, and in the aerobic and anaerobic abilities in the production of energy.

The development of the respiratory system means pushing more air (oxygen) into the working muscles as quickly as possible, and with the least number of breathing times, which leads to a reduction in fatigue for a long time without a decrease in the level of athletic activity.The process of programming and planning the training according to correct scientific foundations depends on the type of relationship between the components of the pregnancy and the specificity of the type of effectiveness practiced, and the process of interconnection of these functional abilities is an important aspect in the training process and the adoption of various training methods based on the adaptation of the cardiocirculatory and respiratory systems, which leads to significant development events in functional variables that work to develop physical work and delay the onset of fatigue.

Here, the importance of the research lies in finding out the extent of the important effects of these approaches on the development of the research variables for tennis practitioners by developing some functional variables in tennis players using some appropriate training methods to improve the efficiency of the respiratory circulatory systems and important variables.

1-2 Research Problem:

When practicing sports training, it leads to functional changes that include almost all the internal organs of the body, and the process of functional adaptation and the body's response to the performance of physical work is done through a group of systems in the body, the most important of which is the circulatory respiratory system. The effect on this device through physical load is what the researcher wanted to achieve by using some aids to improve his work. The effect of the devices used in increasing the burdens on the functional organs, especially the circulatory and respiratory systems, can be observed, and here the research problem lies in the use of some tools and aids to know the extent of their impact on the functional variables of tennis players.

1-3 Research Objectives:

- Knowing the effect of some training methods that help in the development of some functional variables of tennis players.
- Knowing the effect of the training curriculum on the development of some functional variables.

1-4 Research Hypothesis:

1- There are significant differences of assistive means training in some functional variables: experimental research and control between the pre- and post-tests.

2- There are significant differences in the post-tests between the control and experimental groups and in favor of the experimental group.

1-5 Research Areas:

1- ***Human Field***: A sample of (12) tennis players for the year 2023-2024.

2- ***Temporal Domain***: Period from 7/1/2024to 14/3/2024.

3- ***Spatial field***: Tennis courts / Al-Shaab International Stadium, and Sport Physiology Laboratory / College of Physical Education and Sport Sciences / University of Baghdad.

2. Research methodology and field procedures:

2-1 Research Methodology:

The researcher used the experimental method method, and the researcher added the proposed tools to the research sample to identify their impact and suitability.

2-2 The research population and its sample:

A sample of (12) tennis players from the year 2024 was taken, and they represent the research community. Then the sample was divided randomly and by lottery method into two equal groups (6) players for each group representing the experimental group and the control group.

Table (1)
Between the arithmetic mean, standard deviation, median and torsion coefficient of the research sample

Torsion coefficient	Broker	Standard deviation	Arithmetic mean	
1.35	21	2.04	22.19	Age
1.59	177	6.63	179.72	Length
1.23	72	10.07	73	Weight

2-3 Methods, Tools and Devices Used in the Research:

- Arab and foreign references and appendices.
- Cateye EC- T220 Fitness Japan Treadmill.
- Italian-made Seca device for measuring both height and weight together.
- Pulse measuring device (MBO) made by Yabani

Protective mask: It is a rubber and triangle-shaped mask that has two eye openings, a nose opening, and a mouth opening, and an air filter is installed inside the opening, and it is used to prevent gases, and it is Russian-made.

- Clocks (3)
- Electronic Forced Exhalation Volume Measurement Device (Spirometer)
- TRAY-MADE TACKLE TAKSUN TYPE HANDHELD CALCULATOR.
- Japanese-made stationary bike device.
- Pinching of the nose.

Assistant Team.(*)

2.4 Exploratory Experiment:

The researcher conducted an exploratory experiment on Saturday (7/1/2024) at 4:00 pm, where he measured height, weight and other variables in the physiology laboratory at the Faculty of Physical Education and Sport Sciences / University of Baghdad.

Tests of biocapacity, forced exhalation volume, and pulse, tests of maximum relative oxygen consumption were conducted on the bicycle for the research sample, and the tools prepared for this study were conducted to show their validity, and the exploratory experiment was conducted with the aim of knowing the validity of these tools under study.

2.5. Research Procedures:

2.5.1 Measurements used in the research:

1- Measurement of height and weight (anthrometric):

2- Measuring some functional variables:

A. Resting time heart rate (pulse) measurement:

The pulse rate of the experimental sample members was measured after they left the sta and measured it in the laboratory and before the players boarded the treadmill before we the mask by the portable medical device (MBO DIGLNEP6) that works electronica measure the pulse and pressure together before performing physical exertion.

B. Measuring the pulse rate immediately after the voltage and one minute after the voltage

The athlete starts working on the treadmill at a certain speed and the speed is fixed until the pulse reaches (140-160 n/d)1

Rest for one minute after removing the mask, then the pulse rate is measured again and the pulse is monitored to see which is faster with or without the mask to see how the mask improves the pulse rate.

C. Measurement of the maximum relative oxygen consumption R.VO2 Max.:

The rate of oxygen consumption was measured by the method of Fox (1975),[i] which is one of the easiest methods in estimating this scale, and this test is performed using an ergometric bicycle with a load intensity of 150 watts (900 kg/m/min) after working for five (5) minutes, then the pulse rate is taken and then the heart rate is multiplied by the equation

to extract the maximum oxygen consumption, then divided by the body weight to produce the relative maximum according to the equation is as follows:

Maximum oxygen consumption (L/min) = 6.3 – 0.0193 × heart rate below max

The heart rate was (150-170).

Predicted Max. Vo2 (LITERES Per Min) = 6.3 – 0.0193 × HR Sub

D. Measurement of Biological Capacitance (VC):

After explaining the test to the athletes, and explaining how to use the (spirometer) device to measure the volume of the capacity and the volume of forced exhalation, it is a device in the form of a steel box in which there is a screen to read numbers electronically without feeding the device with numbers and contains an air hose, and this device works by pressing the power button. The numbers are miniature, and when exhaling, the device reads the volume to be measured, after the athlete finishes his work on the device, he is given a rest for one minute, and then he takes the maximum inhalation to exhale into the device after putting the nasal tube to prevent air from leaking out of it, three attempts are given to each athlete who chooses the best one."

E. Measurement of forced expiration volume in the first second (FEV):

This indicator is important for swimmers as it defines the adequacy of the respiratory system, and the amount of exhalation that the lungs exhale during the exhalation process, and this indicator is measured on the previous device itself in the same way of performance, but it is the indicator that the athlete takes the maximum inhalation of the air from the hose itself after performing an operation to inhale externally and exhale in the device, and three attempts are given to each athlete to choose the best of them

2-6 Pre-Tests:

The pre-tests were conducted on the experimental and control research sample, which were (12) players, on Sunday, 17/1/2024, starting at four o'clock in the afternoon. Most of the tests were conducted in the laboratory of the College of Physical Education and Sport Sciences/University of Baghdad, and the measurements of height, weight, and functional variables were recorded, and they are required to be studied with the help of the assistant team.

2.7 Training Curriculum and Duration of its Implementation:

2-9 Statistical Methods:

The researcher used the SPSS statistical package to process the results:

- Arithmetic mean : $= \frac{Mags}{N}$

Standard deviation = $p = \sqrt{\frac{\{MgS2 - (MgS)^2 / N\}}{N-1}}$

3- T-test for asymmetrical (independent) samples, pre-test, and pre-test[ii]:

$$T = \frac{S1 - S2}{\sqrt{\frac{K1^{2} + K2^{2}}{N-1}}}$$

4- Test (T) for symmetrical (non-independent) samples, pre-test, and post-test.

$$T = \frac{MG\ F}{\sqrt{\frac{N\ Mg\ F2 - (Mg\ F)^{2}}{N-1}}}$$

3. Presentation, analysis and discussion of the results:

3.1 Presentation and analysis of the results:

3.1.1 Presentation of resting pulse measurement results:

Table (2)

The mean of the calculation, standard deviation, and the value of (v) calculated in the post-tests of the two groups to measure the pulse at rest time

Significance Level	Error Level	Value (t)	Post-tests		Collection
			± P	Going to	
Willy-nilly	0.432	0.763	3,24	68,32	**Experimental**
			3,18	69,65	**Officer**

The significance is significant at an error ratio of 0.05 and a degree of freedom (10)

3.1.2 Presentation and analysis of pulse measurement results after exertion:

Table (3)

The value of the arithmetic medians and standard deviations of the two groups in the post-tests

Significance Level	Error Level	Value (t)	Post-testing		Collection
			± P	Going to	
Moral	**0.000**	**3.660**	**3.69**	**171**	**Experimental**
			4.12	**168**	**Officer**

The significance is significant at an error ratio of 0.05 and a degree of freedom (10)

3.1.3 Display of pulse measurement results after a minute of effort:

Table (4)

The mean value of the arithmetic mean, standard deviation, and the calculated value of (v) for the two groups in the pulse measurement post-test after one minute of effort

	Error Level	Value (t)	Post-tests	Collection

Significance Level			± P	Going to	
Moral	0.000	2.85	2.64	140.3	Experimental
			2.99	142.5	Officer

The significance is significant at an error ratio of 0.05 and a degree of freedom (10)

3.1.4 Presentation of the results of the measurement of forced expiratory volume, 1FEV:

Table (5)

The mean of the calculation, standard deviation, and the calculated value of (v) for the two groups to measure the volume of forced exhalation in the post-test

Significance Level	Error Level	Value (t)	Post-tests		Collection
			± P	Going to	
Moral	0.022	2.01	0.421	2.77	Experimental
			0.318	2.62	Officer

Significance at 0.05 and 10 degrees of freedom

3.1.5 Presentation of the results of the VC bioamplitude measurement:

Table (6)

The mean and standard deviation of the measurement of the biocapacity of the two groups in the post-test

Significance Level	Error Level	Value (t)	Post-tests		Collection
			± P	Going to	
Moral	0.000	3.025	0.018	3.89	Experimental
			0.022	3.61	Officer

Significance at 0.05 and 10 degrees of freedom

3.1.6 Presentation of the results of the measurement of the maximum relative oxygen consumption:

Table (7)

Mean and standard deviations of the two groups in post-tests to measure the maximum relative oxygen consumption (R. VO2. Max.)

Significance Level	Error Level	Value (t)	Post-tests		Collection
			± P	Going to	
Moral	0.000	3.77	3.23	44.87	Experimental
			3.64	38.47	Officer

Significance at 0.05 and 10 degrees of freedom

3-2. Discussion and analysis of the results:

- Discussion and analysis of the results of resting pulse rate measurement:

Table (2) shows the results of resting time pulse measurement for the control groups (lesson group) and the experimental continuous training group. The results of the table showed random differences between the pre- and post-tests in the results of pulse measurement at rest, while the results of tables (3) (4) showed significant differences for pulse measurement during exertion, and after a minute of effort in the post-test for the

control groups (lesson group) and experimental group of continuous training, and in favor of the post-test.

The researcher believes that the reason for this is the response of the sample to the proposed tools with the training method in the development of functional variables, as the results actually indicated the clear development in the heart rate as well as in the respiratory system and its variables from physiological and morphological aspects, and that the most important development that occurred was the decrease in a small percentage of the pulse rate of the research sample at the time of rest, and the return to rapid hospitalization, which indicates the development of the respiratory system, in addition to the percentage of development in the pulse rate helped to Increasing the volume of blood pushed into the working muscles with the amount of oxygen required to perform physical exertion while reducing the onset of fatigue. [iii]Sperryn confirmed this by saying that the heart adapts during rest and during exertion quickly to return to normal, and this is evident in athletes who practice endurance and endurance games.

- Discussion and analysis of the results of the measurement of forced expiration volume in the first second (FEV1):

Table (5) shows the results of measuring the volume of forced exhalation for the experimental and control groups in the pre- and post-tests. The results in the table indicated that there were statistically significant differences between the two tests and in favor of the post-test.

The researcher attributes the reason for this development in this functional variable to the contribution of the training curriculum to the development of the respiratory system, and work to increase the efficiency of the respiratory system, as this indicator is important for tennis players to know the extent of the development of the adequacy of respiratory capacity through the processes of exhalation and inhalation, the performance of which requires a high effort of the respiratory muscles.

- Discussion and analysis of the results of the measurement of the biocapacity (VC1):

Table (6) shows the results of the measurement of the vital capacity of the control and experimental groups. The results of the table showed that there were statistically significant differences between the pre- and post-tests in favor of the post-test.

The researcher believes that this development in this functional variable is due to the use of assistive tools, as these tools helped to improve this variable, in addition to improving the ability and function of the lungs to absorb a greater amount of air when inhaled and a greater amount of air is pushed to the muscles, due to the wide space inside the rib cage. The flexibility of the pectoral muscles, which is important for players, as it helps to reduce the number of times they breathe by absorbing more air at a time One.

"Qasim al-Mandalawi has pointed[iv] [out] that regular exercise leads to positive functional changes in the respiratory system, and these changes achieve additional flexibility in the rib cage muscles, which increases their ability to stretch and expand, leading to an increase in the volume of air inhaled, which helps the amount of oxygen entering the alveoli and facilitates breathing movements due to the increase in vital capacity." (West) West)[v])"

indicates that athletic training leads to an increase in vital capacity as a result of increasing the ability of the pectoral muscles to expand."

- Discussion of the results of the measurement of the maximum relative oxygen consumption (R.VO2. Max.) and its analysis:

Table (7) shows the results of the tests to measure the maximum relative oxygen consumption of the control and experimental groups (the experimental group and the continuous training method). The results showed that there were statistically significant differences between the pre- and post-tests and in favor of the post-test.

The researcher believes that the reason for this development in this functional variable is the extent to which the proposed training curriculum contributes to its development, this indicator attributes the development of the respiratory system through what the athlete consumes when performing an effort, where the percentage of what the athlete consumes is estimated at about 56.5 ml/kg/min according to the running distance for 15 minutes on the track.

Abul Ela Ahmed[vi] believes that the percentage of oxygen consumption varies according to the effectiveness and that the method of training endurance athletes and long-distance swimmers have a higher percentage of (O2) consumption."

The researcher points out that the percentage of oxygen consumption of endurance athletes is higher than other athletes, andevery increase in body size, age and weight leads to an increase in the percentage of human consumption of (O2), and that the increase in the percentage of oxygen consumption of athletes is a result of the development that occurs in the respiratory system and the size of muscles working during physical exertion.

5. Conclusions and Recommendations:

5.1 Conclusions:

A. There is a clear effect of the proposed tools in improving the functional efficiency of the circulatory and respiratory systems.

b. The method of training in the lab and with the same intensity as the player on the field has almost similar results

c. Functional devices improve and develop in pushing larger amounts of oxygen to the working muscles, and this is what the researcher wanted to reach in the research hypotheses.

D. The study showed a noticeable effect of assistive tools in improving functional variables.

5-2 Recommendations:

1- Using these tools on the court to gain time in laboratory training for tennis players.

2- The protective mask can be used on other devices (such as an ergometric bicycle) to perform the same task.

3- Adopting other training methods with the proposed method to better develop the circulatory and respiratory systems.

4- It is preferable to use these tools in different ages in tennis training, as well as in the use of the national team players.

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