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The effect of S.A.Q training on some biochemical variables and motor abilities of soccer players aged (22-26)

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Summary of the research

The study aimed to know the extent of the effect of (S.A.Q) training on some biochemical variables and motor abilities, because (S.A.Q) training is one of the modern training methods and the advantages of these trainings, which have become of interest to many athletes, and also because it is an integrated training form in which there is alternation between transitional speed training, coordination and accuracy, agility training and motor speed training during the training unit. The research problem also crystallized in the lack of scientific studies on these trainings, which the researcher believes through the results of this study can provide some scientific assistance to officials in the field of physical fitness and sports training physiology in general and (S.A.Q) training in particular. Therefore, the researcher directed the study of these trainings because these trainings are one of the modern training methods. The researcher's study also included theoretical and similar studies related to the research topic. The researcher adopted the experimental method with one group as it is the most appropriate method for the nature of the research. The research sample was the players of the Al-Masafi Football Club in Baghdad Governorate. The study was conducted on a sample of (16) players who were chosen intentionally. The results of the statistical analysis using the Statistical Package for Social Sciences (SPSS) showed that there were statistically significant differences at the level of

(sig) < (0.05) between the two tests (pre- and post-test) for the members of the experimental group.

1-1 Introduction to the research and its importance :-

Training is a long-term development process characterized by continuity and correct gradation. It is subject to the foundations and rules of sports training that are characterized by comprehensiveness in developing and improving the individual's skills and motor and physical abilities to enable him to practice his physical activity with the least possible effort and in the best possible way. This depends on the training method used and the extent to which the body's functional systems adapt through training. Whereas (S.A.Q) training is one of the modern training methods used in the sports field (it depends on dividing speed into three main components: transitional speed, speed of changing direction (agility), and interactive motor speed), and the goal of (S.A.Q) training is to combine transitional speed, speed of changing direction (agility), and motor speed in addition to coordination and accuracy during the training unit by developing physiological functions and high motor abilities, as it seeks to develop a program to prepare players in the best possible way. The importance of the research appears in the placement of (S.A.Q) exercises during the training unit and includes exercises for each of (total body agility during transitional movement - coordination - accuracy) during the training unit and knowing everything that will be mentioned scientifically, as the researcher saw fit to study some (biochemical variables and motor abilities of the refinery club players in order to know the effect of these exercises on some biochemical variables and motor abilities, and to know the effect of the external load of these exercises and standardization of the training method in order to contribute to raising the training process to what is modern to improve the level of players' performance and raise the level of their abilities.

1-2 Research problem :-

The problem of the research lies in the lack of scientific studies on these exercises, which the researcher sees through the results of this study that some scientific assistance can be provided to those responsible in the field of

physical fitness and sports training physiology in general and those interested in (S.A.Q) exercises in particular, and this is by knowing the effect of (S.A.Q) on each of the variables (biochemical and motor abilities) so that this would be a scientific step in knowing the extent of biochemical adaptations and motor changes and also a step in technicalizing training programs for (S.A.Q) exercises.

1-3 Research objectives :-

- Number of S.A.Q exercises for Al-Masafi Club players aged (22-26).
- Identifying the effect of S.A.Q training on some biochemical variables among Al-Masafi Club players aged (22-26).
- Identifying the effect of S.A.Q training on some motor abilities of Al-Masafi Club players aged (22-26).

1-4 Research hypothesis :-

- There are statistically significant differences between the pre- and post-tests for some biochemical variables before and after the effort for the S.A.Q exercises among Al-Masafi Club players aged (22-26).
- There are statistically significant differences between the pre- and post-tests for some motor abilities of the (S.A.Q) exercises among Al-Masafi Club players aged (22-26).

1-5 Research areas :-

- Human field: Al-Masafi Club players.
- Time range: 2/12/2024 - 4/12/2024.
- Spatial area: Al-Masafi Club.

3- Research methodology and field procedures :-

3-1 Research methodology :-

The researcher used the experimental method that depends on one experimental group with two pre-tests and a post-test, because it is compatible with the nature of the research problem, by conducting a series of tests on the dependent variables, and the pre-tests express the basis or the beginning and are widely used in physical research and life sciences, and the effect of the experimental treatment is expressed by the difference between

the average measurements that preceded the statistical treatment and those that followed it. (Dhafer Hashem Ismail: 2012, p. 151.)

3-2 Research sample :-

The researcher identified the research population represented by Al-Masafi Football Club players for the year 2020 - 2021, who numbered (20) participants, whose ages ranged from (22 - 26) years, as four were excluded as a result of their abstention from conducting blood tests, and the researcher selected the research sample in an intentional manner. This is because this sample achieves the purposes of the study carried out by the researcher.

Table (1)

The research sample, the excluded players, and their percentages

Sample/number and percentage	the number	percentage
The research sample	**20**	100%
Experimental research sample	**16**	80%
Excluded players	**4**	20%

3-4 Means of collecting information, devices and tools used: -

3-4-1 Means of collecting information:

- Arabic and foreign sources and references and the Internet.
- Note .
- Personal interviews.
- Medical cotton, sterile materials, a medical syringe, a cooling container, special kits to determine the level of the (PFK) - (LDH) enzyme in the blood, a laboratory assistant team, a centrifuge (Center Fuge), and a Cabas C311 device for analysis .

3-5 Tests used in the research :-

3-5-1 Tests for blood variables (biochemical) :-

3-5-1-1 Test to measure the concentration of the enzyme phosphofructokinase (PFK) :-

- The purpose of the test: to measure the level of PFK enzyme concentration in the blood before and after exercise.

3-5-1-2 Test to measure the concentration of the enzyme lactic dehydrogenase (LDH) :-

- The purpose of the test: to measure the level of the enzyme (LDH) in the blood before and after exercise.

3-5-2 Tests of motor abilities :-

1- Name of the test: Zigzag running test using the Barrow method . (Ali Salloum Jawad:, 1st edition, p. 121)

- **Purpose of the test :** to measure the overall agility of the body during a transitional movement.
- **Tools used :** a rectangular running field built on solid, rough ground, 4.75 m long and 3 m wide, a stop watch, five of the posts used in high jumping, or corner flags such as those used in football, noting that the length of the post is not less than Or the flag is 30 cm.
- **Conducting the test :** The tester takes the ready position from the high start behind the starting line, and when the start signal is given to him, he runs zigzagging between the five posts three times in a row.
- **Recording :** The time it takes the tester to cross the rectangle three times is recorded to the nearest 10/1 second, starting from the moment the start signal is given until he crosses the finish line after completing the third lap.

2- Name of the test: Numbered Circles Test . (Mohamed Sobhi Hassanein, 1995, p. 416)

- **Purpose of the test :** to measure the coordination between the eyes and the legs.
- **Tools used :** a stop watch. Eight circles are drawn on the ground, each with a diameter of (60) centimeters, and the circles are numbered.

- **Conducting the test :** The tester stands inside circle No. (1), and when he hears the start signal, he jumps with his feet together to circle No. (2), then to circle No. (3), then circle No. (4)... until circle No. (8) and is completed. That's at full speed.
- **Recording :** The tester records the time it takes to move through eight circuits. Figure (5) shows the numbered circuit test.

3- Name of the test: Ball scoring test . (Raad Hussein Hamza: 2003, p. 108.)

- **Purpose of the test :** to measure the accuracy of scoring inside the foot.
- **Tools used :** seven footballs, a bar, a rope, and a goal divided into specific areas according to.
- **Conducting the test :** (7) balls are distributed in the penalty area, and he starts running from behind the mark on the penalty arc towards the first ball and aims, then returns to circle around the mark, then heads for the second ball... and so on with all the balls, and the scoring is higher than the ground level. The performance should be done from the running position and from the inside of the foot.
- **Scoring :** The score is calculated by the total score that the player obtains from scoring balls

The seven are as follows :

- The player is awarded (3) marks if the ball enters the two designated areas (21).
- The player is awarded one score if the ball enters the designated area (3).
- The player is awarded a zero if the ball leaves the goal area.
- The maximum score for the test: (21) degrees.

3-6 Exploratory experience :-

The researcher conducted the exploratory experiment on the (3) Al-Masafi Football Club players on Thursday, February 6, 2024, at (10) am in the Al-Masafi Club stadium . The purpose of the exploratory experiment was:

1- Understand all regulatory aspects to know the management of tests (biochemical - kinetic).

2- Knowing the obstacles that may appear when testing begins, and avoiding errors during the work period.

3- Ensure the validity of laboratory equipment and tools used in tests.

4- Ensure the competence of the assistant work team and the extent of its understanding of implementing tests and measurements.

3-7 Main procedures :-

3-7-1 Pretests :-

The researcher conducted pre-tests for the research sample, which numbered (6) trainees, over two days (Friday - Saturday), corresponding to each of (2/10/2024 - 2/11/2024). The tests were divided as follows: the tests (motor tests) were on the day Saturday at 10 am, in the presence of the assistant work team, and tests (biochemical variables (blood analysis)) on Sunday at 10 am, in the presence of the assistant work team and the laboratory doctor.

3-7-2 Training curriculum for S.A.Q training :-

After reviewing the available sources and references of sports training science, and the experiences of the supervising professor and the club's coach, and the researcher's modest experience, as he is one of those interested in (S.A.Q) training, the researcher worked on preparing a training curriculum for (S.A.Q) training in a manner that is consistent with the game of football. The researcher applied the training curriculum, which consisted of a group of exercises that were specially prepared to develop some biochemical and motor abilities. The training units were at a rate of three training units per week for the research group for a period of (two months), amounting to (22) training units, each training unit included 3 exercises. The researcher took into account the following when applying the exercises:

- Principle of undulation with training load.
- The intensity used in the exercises ranged from (80-100%) of the maximum that the athlete can bear.

- The duration of the exercises ranged from 25 to 30 minutes in the main part of the training unit, which ranged from 85 to 90 minutes.
- The researcher took into account the principle of diversity in training and the exercises that were used, and most of the exercises were with balls to raise the morale of the player and ensure that he does not feel bored by repeating or repeating some exercises, as well as by diversifying the places and method of working in the exercise.

3-7-3 Posttests :-

The researcher conducted post-tests for the research sample on two days (Saturday - Sunday), corresponding to each of (April 13, 2024 AM at 10 o'clock - April 14, 2024 AM at 10 o'clock), after passing (22) training units. The researcher was keen to provide the same conditions under which the pre-tests were conducted in terms of tools, time for conducting the tests, and place, with the assistance of the same work team, the assistant and the laboratory doctor.

3-8 Statistical methods :-

The SPSS statistical package was used

- **Arithmetic mean .**
- **standard deviation .**
- **Tests for symmetrical samples.**
- **Torsion coefficient.**

4- Presentation, analysis and discussion of the results:

4-1 Presentation and discussion of the results of blood variables (biochemical) tests.

4-1-1 Presentation and discussion of the results of the pre- and post-tests for the concentration of the enzyme creatine phosphokinase (LDH) in the blood :-

Table No. (2)

It shows the arithmetic mean and standard deviation before and after the test (percentage of LDH enzyme concentration in the blood) before and after the effort, the arithmetic mean of the differences between them and their deviation, the calculated (t) value, the true significance, and the result for the individuals in the research sample.

Measurements	measruing unit	Tribal		after		F	F Y	Calculated t value	The real significance	The result
		X	Y	X	Y					
LDH before voltage	U / L	176.50	26.91	372.50	53.91	196.00	25.20	-7.777-	٠.001	moral
LDH after voltage	U / L	173.66	47.94	324.00	27.61	150.33	28.76	-5.226-	٠.003	moral

Significant when the value of (sig) is < (0.05) at a degree of freedom (5) and a significance level (0.5)

Through Table No. (2) discussing the results of the lactic dehydrogenase (LDH) test, we find the results of the percentage of this test for the experimental research group, where the results showed the presence of significant statistically significant differences between the two tests (pre-post) in the concentration ratio of the enzyme (LDH). The researcher believes that the reason for the appearance of significant differences before the effort is due to the fact that the concentration ratios of this enzyme lactic dehydrogenase (LDH) in the blood continue for (24-48) hours (Kaahe org) (Nathional 2011. p. 10) due to the high effort of the (S.A.Q) training, as for the concentration ratio of the enzyme (LDH) after the effort, the results showed the presence of significant statistically significant differences between the two tests (pre-post) in favor of the post-test among the individuals of the research sample, and the researcher attributes the reason for the appearance of significant differences to the fact that this enzyme is from the group of oxidizing and reducing enzymes and is responsible for

Completion of the metabolic process of lactic acid and its conversion to pyruvic acid, as this enzyme works to increase the ability to perform despite the accumulation of lactic acid, which works to remove and dehydrogenate (2H), and the importance of this enzyme lies in stimulating the reaction in the opposite direction, producing energy (ATP) when there is a lack of oxygen, while the reaction in the other direction supplies the cells with pyruvic acid, which is oxidized in the (citric acid) cycle to produce energy

with the availability of oxygen. (Robert . E.C. Weidmi :, 2000, p, 85) .

4-1-3 Presentation and discussion of the results of the pre- and post-tests for the concentration of the enzyme phosphofructokinase (PFK) in the blood :-

Table No. (3)

Measurements	measruing unit	Tribal		after		F	F Y	Calculated t value	The real significance	The result
		X	Y	X	Y					
PFK before voltage	U / L	1.766	٠.152	1.778	٠.183	-٠.011-	٠.153	-٠.076-	٠.942	Insignificant
PFK after voltage	U / L	1.616	٠.104	2.791	٠.243	-1.175-	٠.307	-3.819-	٠.012	moral

It shows the arithmetic mean and standard deviation before and after the test (percentage of PFK enzyme concentration in the blood) before and after the effort, the arithmetic mean of the differences between them and their deviation, the calculated (t) value, the true significance, and the result for the individuals in the research sample.

Significant when the value of (sig) is < (0.05) at a degree of freedom (5) and a significance level (0.5)

Through Table (3) discussing the results of the phosphofructokinase (PFK) test, we find the results of the percentage of this test for the experimental research group, as the results showed no significant statistical differences

between the two tests (pre-post) in the concentration ratio of the enzyme (PFK) before the effort. The researcher believes that the reason for this is that this enzyme is of low effectiveness during rest periods or not doing physical effort, because this enzyme is one of the anaerobic enzymes and is responsible for the rapid decomposition of glucose (Henviksson, J. cellular metabolism). As for the concentration ratio of the enzyme phosphofructokinase (PFK) after the effort, the results showed significant statistical differences between the two tests (pre-post) in favor of the post-test among the research sample individuals. The researcher attributes the reason for this to the emergence of significant differences for the post-tests (after the effort). The (S.A.Q) exercises combine the three energy systems, as Focus during training on the second system due to the high intensity and repetitions of (S.A.Q) and this leads to an increase in lactic acid as "the enzyme phosphofructokinase (PFK) is one of the most important enzymes for the second energy system (lactic acid system) as increasing its activity leads to the rapid decomposition of glucose in addition to the rapid formation of lactic acid and the reconstruction of ATP and the activity of the enzyme (PFK) increases with the accumulation of adenosine monophosphate (AMP) and its activity decreases with the accumulation of adenosine triphosphate (ATP). (Henviksson;1988

4-3 Presenting and discussing the results of the pre- and post-tests of the motor abilities tests of the legs for each of (total agility of the body during a transitional movement - compatibility - accuracy) : -

Table No. (4)

It shows the arithmetic mean and standard deviation before and after tests of motor abilities, the arithmetic mean of the differences between them and their deviation, the calculated (t) value, the true significance, and the result for the individuals in the research sample .

Physical exam variables	measruing unit	Tribal		after		F	F Y	Calculated t value	The real significance	The result
		X	Y	X	Y					
The overall	second	3.61	٠.35	4.458	٠.323	0.848	٠.05	-16.199	٠.000	moral

agility of the body during a transitional movement								-		
Compatibility	second	78.333	73.59	133.00	78.87	39.28	15.28	2.570	0.023	moral
Precision	Class	33.583	3.37	53.08	2.142	19.50	4.17	-4.666-	٠.006	moral

Significant when the value of (sig) is < (0.05) at a degree of freedom (5) and a significance level (0.5)

Through Table No. (4) for each of (total agility of the body during a transitional movement - compatibility - accuracy), we find the results of these tests for the single experimental research group, which showed the presence of statistically significant differences between the pre-test and the post-test in favor of the post-tests among sample members. Research, and the researcher attributes this to the effectiveness of the exercises (S.A.Q) used correctly, scientifically, successfully and effectively in terms of the intensity and volume of sports training and rest according to the intensity that is compatible with the requirements of (total agility of the body during a transitional movement - compatibility - accuracy).

The researcher attributes the development in the agility variable to the nature of the (S.A.Q) exercises used according to the scientific foundations of sports training for their interest in developing special physical fitness such as the ability to change directions and start from acceleration to deceleration in a smooth manner that is consistent with the capabilities and abilities of the players from the start movements and change of direction and body positions on the ground and in the air in different directions and positions and with appropriate repetitions that helped improve the agility of the players. This is what (Essam Abdel Khaleq) emphasizes: “The more agile the athlete is, the more quickly he can improve his level, provided that we do not forget the basic educational principle of gradual progression from simple to complex, as the individual must analyze it into its simple components (Essam Abdel

Khaleq: 2005, p. 148), as good training in football is characterized by planning and continuous organization according to scientific foundations that ensure a positive impact on the player's level and the continuation of his progress in the various aspects of football, such as the principle of gradual increase in the load, such as the correct timing of repetitions. (Khaled Tamim Al-Hajjaj: 2016, 139) .

As for the compatibility variable, the research attributes the development to the (S.A.Q) exercises, as it harmonized the nervous and muscular systems, in addition to the effect of speed, agility and compatibility exercises within the (S.A.Q) exercises prepared by the researcher, which contained many variables and interactions between complex movements and simple movements during performance. Also, the (S.A.Q) exercises require high-level neuromuscular stimulation with high intensity in performance and high degrees of motor compatibility, as it requires players to exert their utmost effort with high accuracy and focus, and through this, motor compatibility improves significantly, as (Qasim Hassan Hussein and Mansour Al-Anbaki) confirm that "there is a reciprocal relationship between the components of motor compatibility and technique, and it depends entirely on developing physical qualities such as speed and strength, and it depends on the safety of the organs and nerves, and this requires the efficiency of the nervous system."

As for the accuracy variable, the researcher attributes this development in the accuracy variable to the effectiveness of the (S.A.Q) exercises through their impact on developing the skill of scoring with the inside of the foot, as most of these exercises end with scoring on a small goal of one meter to increase the player's accuracy in scoring with the inside of the foot. When returning to natural and legal goals or during matches, it will be noted that there is a big difference in the development of the scoring skill and the development of coordination and motor coherence to improve the nervous system by combining the speed of motor performance and accuracy in shooting. Since modern training focuses on scoring, as it is one of the most important goals of daily training for players, or the success of the match may depend on one decisive moment from which the player shoots the ball into

the opponent's goal to score a goal, this is what all football specialists emphasized, including (Al-Rubaie, Al-Mashhadani) by saying that it is necessary to build training units on learning scoring and the focus must be on accuracy and gradualness to achieve strong dynamic scoring.

5- Conclusions and recommendations :-

5-1 Conclusions:

Within the limits of the research problem and its importance, and in light of its objectives, hypotheses, and the nature of the sample, and within the framework of statistical treatments, interpretation and discussion of the results, the researcher was able to reach the following conclusions:

1- S.A.Q training has an effect on the proportions of some biochemical variables.

2- The S.A.Q training developed the following motor abilities:

- Total agility of the body during a transitional movement.
- Compatibility .
- Precision .

5-2 Recommendations :-

Based on what the conclusions derived from the statistical analysis and the discussion and interpretation of the results indicate, the researcher makes the following recommendations:

1- The necessity of codifying S.A.Q programs in a sound and scientific manner, taking into account the necessary conditions and specifications for sporting events and in accordance with the characteristics of each age stage.

2- Conduct further studies on S.A.Q training for different (biochemical - physiological - physical) variables to benefit from the uses of this type of training.

3- Using S.A.Q exercises during the special preparation period for some sporting events.

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