DETERMINATION OF NUMERICAL INDICATORS TO ESTIMATE THE COMPONENT OF THE THINNEST BODY AND ITS LINEAR RELATIONSHIP TO LACTIC ACID ACCUMULATION AND THE ACCURACY OF THE PERFORMANCE OF SOME BASIC SKILLS IN TENNIS

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ABSTRACT

Each sports activity has special physical requirements that need to be met. This is part of the great interest in sports and what constitutes tennis sport of great interest in the world of sports and through observation and awareness of the researchers, including March the game of tennis ground and taught and taught in practical lectures These topics, especially with respect to the methods and measurement of anthropomorphic body style, are of great interest to many foreign scientists who designed special equations and tables that help the reader to know the pattern of his body and went to the study of the human body in terms of its shape and size, The researchers studied the components of the athlete's body style for their relationship with many kinetic abilities and indicators of superiority, which can be used to select the players and players according to the type of sport activity as well as the knowledge of its linear relationship with accumulation Lactic acid and the accuracy of the performance of some basic skills in ground

Keywords: lactic acid accumulation, performance, tennis

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INTRODUCTION

Every sports activity has special physical requirements that must be met. Therefore, the development in modern technologies, knowledge and science of all kinds has become a powerful incentive for everyone who wants to know and invest everything that is new in order to advance in the various scientific and mathematical fields [1]. Within this comes the great interest in sports and the great interest that the tennis sport represents in the sports world now. This game is the most popular in the world after the football game, but almost before the football. From that, the importance of our research came in the study of the components of the athletic body pattern because of its relationship with many kinetic abilities and indicators of excellence, on the basis of which players and players can be selected in proportion to the type of each athletic activity [2]. So that it can reach an accurate determination of the composition of the body as well as knowing its linear relationship with the accumulation of lactic acid and the accuracy of the performance of some basic
skills of tennis, as it serves the teaching and training process and gives a clear picture of the overall unity of the structure of a person [3].

The game of tennis is one of the fast sports in its dynamic and technical performance by its practitioners. Also, the tests are the real test of the validity of this practiced performance and its accuracy in terms of evaluating that performance. Therefore, the researchers wanted to study the body pattern due to the lack of clarity in the player's total body mass assessment process, which consists of the weight of fats and the fat-free weight of the athletic individual and the possibility of giving information of accurate scientific value, Especially since this variable has a major effect that will be negative on the amount of calories lost. In addition to the amount of productive force, this certainly reflects negatively on the aspects of movement and achievement. So the researchers identified their research problem by identifying digital indicators to estimate the component of the body’s thinness and its relationship to lactic acid accumulation and the accuracy of the performance of some basic skills for tennis players in order to know their level in order to reach new future results, and pave the way for upcoming scientific research to find out what is happening in the body to reach To high athletic levels.

**Objectives**

1- Defining numerical indicators for estimating the body weight component of tennis players.

2- Knowing the linear relationship between the body’s slim component with lactic acid and the accuracy of some performance Basic skills of tennis.

**MATERIAL AND METHODS**

**The human field**: (Basra University team, ground tennis for the season).

**Timeline**: (The period between 1/9/2019 to 10/12/2019).

**Spatial domain**: (ground tennis court in the College of Physical Education and Sports Science).

**Methodology**: (The researchers chose the descriptive approach due to its relevance to the nature of the problem)

**Society and its Sample**

The researchers adopted the intentional method in determining the research community, who are (16) players participating in the university championship in tennis. As for the research sample, they numbered (10) players, who classified them as the best players in the championship with good skill, and the research sample formed a percentage of (62.5%).

**Devices and tools used and means of collecting information**

**Equipment and tools used**

1 portable computer:

(HP PAVILION )Type. With specifications: (RAM 4.00G -3000 CORI - PINTUM IV).
One (1) Casio-Japanese watch
- tape measure.
- Ground tennis court.
- Legal tennis rackets.
- Legal tennis balls.
- Assistant Work Team.
- Whistle (1)

Means of collecting information

The researchers relied on the following methods and tools used:

Arab and foreign sources.

International Information Network (Internet).

Questionnaire form: "Which is one of the basic necessities of most research, and through which the opinions of a large number of individuals with jurisdiction can be sought to benefit from their views to determine the correct destination for the research, - The questionnaire is considered one of the important survey tools for collecting data related to a specific topic. (12: 152)."

The researchers distributed a questionnaire to a number of (3) experts who are professors of ground tennis to determine the most important tests that researchers will use for the two hit skills. Front and back floors, and they also distributed a questionnaire for job tests To determine the appropriate tests for the functional variable, lactic acid, and they were (6) experts from professors of physiology.

Field research procedures

Tests used in the research

The researchers used the method (Heath - Carter) to measure the pattern of the body where (Heath - Carter) reached a method commonly used for its accuracy, objectivity and inexpensive, as this method depends on the following measurements:

1- Height in centimeters Height (cm).
2- Weight (kg).
3- Average height - weight (Ponderal Index)

Height (in cm)

\[
Ponderal \ Index = \frac{\text{Height (in cm)}}{\sqrt{\text{Weight (kg)}}}\
\]
Where they relied on the Ponderal equation to extract the thinnest component using the Heath-Carter body style score card.

For example:

\[
\frac{\text{Weight in kg}}{\text{Height in cm}^3} = 43.4
\]

Then we go to the card to find out where this result falls within the three patterns (fat, muscular, and thin) and the result that appeared to us is that the player fell into the thin component and so on for all players.

After extracting the weight in kg and height in centimeters or inches and pounds for the player, we calculate the results of the Ponderal equation directly. Where it is necessary to calculate the weight and height after which the physical patterns are searched when downloading the player data in a special card prepared by (Heath - Carter) to know the body style and compare the result of the equation with the standard where he recorded the final result of the three components at the bottom of the displayed card which is (obesity component Endomorphy = 1.5) (Muscular component Mesomorphy = 5.5) (Ectomorphy = 3). See Figure 1.

![Heath's body style registration card](image-url)
Conveyance test for (Kongham) and (Falkins) (2: 229):

This test includes running on the moving belt at full speed and at an angle of 9 ⁰ and at a speed of 8 mph (12.5 km / hour) for 3 minutes after that and after 5 minutes have passed since the end of the test we calculate lactic because this test determines the concentration of lactic acid in the blood By a modern device (Lactate Pro) (BLOOD LACTATE TEST METER). The lactic acid device is one of the most recent and specialized reading devices for the concentration of lactic acid in the blood, which is one of the important indicators in knowing the arrival of fatigue in an athlete.

Suggested Skill Test

Test the accuracy of front and back ground skill

These tests are standardized and commonly used and are called the White (Equivalent) tests (1966).

Test name: Front and back ground knock skill accuracy test.

The purpose of the test: To measure the accuracy of the front and back ground stroke skill.

Tools used: ground tennis court, legal rackets, legal balls, string on net width, measuring tape, colored adhesive tapes.

Method of performance: This test is conducted on a regular tennis court, with tennis rackets set up and about (10-15) Tennis ball and registration forms, Figure (2) shows the parking areas of the testers and how to take the test.
Figure 2: The evaluation marks, the parking areas of the testers, and how to conduct a white test to measure the accuracy of the front and back strokes of tennis.

The test includes the position of the player to be tested in the area behind the baseline of the tennis court, is given (5) experimental attempts after warming up to learn how to perform the test. After providing instructions and instructions on the test by the teacher to the laboratory, the ball is struck to the player by one of the assistants and standing on the second side of the field, provided that the ball falls directly behind the transmission, and the laboratory player begins by trying to return the ball with his bat and using the front or back strike. After adding the points, the mean of the attempts is calculated from the front and back strokes.

Among the test conditions is that the ball crosses the net from under the rope and fall to the ground inside the stadium in specific areas in a row and shown in the figure above, and it is given different grades of progressive evaluation and its value ranges from (1-5) degrees.

Test the accuracy of the backhand skill (1: 257-259)

The same way to perform a front ground stroke test, but the way the player performs is to hit the ball in the opposite direction to the striking hand and the rest of the way to perform and calculate the score is the same as in the front ground stroke test.

Exploratory experience (6,9)

The exploratory experiment is one of the most important necessary procedures that the researcher undertakes before performing the basic experiment. Therefore, it is a "preliminary experimental study carried out by the researcher on a small sample before carrying out his research with the aim of choosing the research methods and tools" (79: 9).

The researchers conducted the reconnaissance experiment on a polling sample and they were (3) players, on Tuesday 10/9/2019 at 10 AM, the purpose of which was to:

1- Knowing the obstacles and difficulties that the researcher can face during the main experiment.
2- Knowing the time required to perform the tests and the total time for them.
3- Knowing the validity of devices and tools.
4- Knowing the suitability of the tests for the research sample.
5- Efficiency of the assistant work team.

The main experiment:

The main experiment was conducted from Sunday 15/9/2019 to 1/12/2019 and the experiment was conducted as follows: -
Job tests

The job tests were conducted on Sunday 15-22 / 9/2019 at exactly ten o'clock in the morning, as it included running test on the moving belt for a period of (3) minutes after the player takes a minute for kinetic performance at a speed of 12.500 km / hour and an angle of inclination of (9 °) where it was done Blood sample taken from players after five minutes of effort.

Skill tests

The skill tests were conducted on 25 / 9-2 / 10/2019 at ten o'clock in the morning, as the researchers took into account all climatic, spatial and temporal conditions throughout the test days.

Statistical means

My account medium, Standard deviation, Percentage, Simple correlation coefficient, Fixed amount, Linear regression coefficient, Statistical Package SPSS V16.

Presenting, analyzing and discussing the results

Presenting and discussing the results of the thinness and lactic acid component and some basic skills in Tennis.

After the two researchers reached the results by using tests and to achieve the goals of the research, they presented the results for the possibility of their interpretation and evaluation of their results (11: 179).

Table 1: Arithmetic mean, standard deviations, difference coefficient, highest value and lowest value of search variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of variation</th>
<th>Standard deviation</th>
<th>Arithmetic mean</th>
<th>Measuring unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinness</td>
<td>C.V</td>
<td>± P</td>
<td>± s</td>
<td>Degree</td>
</tr>
<tr>
<td>Lactic acid</td>
<td>34.74</td>
<td>13.94</td>
<td>40.12</td>
<td>Degree</td>
</tr>
<tr>
<td>Forward ground blow</td>
<td>11.05</td>
<td>1.05</td>
<td>9.5</td>
<td>Milli Mall</td>
</tr>
<tr>
<td>Backhand hit</td>
<td>15.51</td>
<td>4.95</td>
<td>31.90</td>
<td>Degree</td>
</tr>
<tr>
<td></td>
<td>14.50</td>
<td>3.09</td>
<td>21.30</td>
<td>Degree</td>
</tr>
</tbody>
</table>

(1) Shows the results of the search variables from the table, where the mean of the thinnest variable is (40.12), a standard deviation (13.94), a coefficient of variation (34.74), the highest value (51.00), and the lowest value (8.04).
As for the results of the lactic acid test, its mean was (9.5), with a standard deviation (1.05), a coefficient of variation (11.05), the highest value (11.1) and the lowest value (8.1). As for the results of the front ground stroke test, its mean was (31.90) and a standard deviation (4.95). And the coefficient of difference (15.51), the highest value (41) and the lowest value (26). Likewise, the results of the posterior ground-strike test have reached an arithmetic mean (21.30) and a standard deviation (3.09), a coefficient of variation (14.50), the highest value (27) and the lowest value (17). Body composition is a term that refers to the presence of fatty and non-fatty parts in the body, just as the weight of any individual on the scale is not an accurate proof of body composition, and this is confirmed by (2,3) saying "There is an inverse relationship between the percentage of body fat and fitness, as the weight of the player on the scale is not an accurate indication of the internal composition of the body and does not reflect the changes that result from relatively regular and long-term athletic training (3: 295).

Many specialists mention that the percentage of fat does not exceed (5%), and this means that (95%) of the player's body weight must be free of fat. And the table is explained by the arithmetic averages. The sample was in the thin component, and this is an important thing that trainers should pay attention to in order to reach the player to the level or muscle pattern, although some players are thin but have muscle strength, This is what we found in the front ground stroke test, and through the results of the arithmetic mean, some players had muscle strength, even though they are skinny, which results in more accurate when directing balls in the areas of the highest degree, while others are the opposite, This is due to the coaches 'emphasis on strength and excessive strength exercises. The intense, codified training units with a few breaks work to significantly influence the nature of the athlete's body's composition

What the athlete resorts to compensate for all this is through the food stored in the body, i.e. from the energy present in the body, especially the liver’s stock, which affects all of this on the athlete's body in a large way. The athlete during his training needs to have muscle mass in order to continue to perform the effort and this requires the coach to have his exercises commensurate with good nutrition and this is confirmed by (2) saying that "sports activities need an increase in muscle mass as this helps in achieving the best results In championship or competition, these sporting activities include speed and ability activities, and this required increase must be, of course, not an increase in body fat weight but an increase in the fat-free body mass, which of course includes muscle tissue that helps increase capacity and strength. (632: 2).

Likewise, there is the nature of athletes with a thin sample, and all of this was a great burden on him and sometimes it reaches the state of early fatigue due to the exhaustion of energy sources, and this is confirmed by (10). Saying that research has proven that the lack of a third of the athlete's body weight is an indication of the beginning of stress. ((122: 10). This is confirmed by (13), saying, "The technical style must be changed according to the nature of the game and its tools in relation to the type of body type (muscular - Skinny) to the pattern (skinny - muscular) and this dramatic change was a direct result in terms of the outcome ") (39: 13-52). Likewise, good, integrated, and integrated training should work to develop the characteristics required for the type of specialized activity, including the use of exercises that develop the energy production systems that the player relies upon when performing technical skill. This was indicated by (7,8), saying, "You must leave space in the training to exercises specific to each skill until the focus is on teaching the muscle groups and involved in the performance of specialized sports activity according to the nature of its work and that the
use of special exercises that mean those Exercises that, if containing an element of the sporting activity or muscle on similar muscle or groups of muscles or close to movement, the direction of movement, strength, and speed (which the muscles do in the movement of races) It will help the player develop endurance both speed and strength as well as their effectiveness because they are similar to the actual performance of the races. "(93: 8-94) (87: 7) This was not found in the sample, where most of the players were suffering from early fatigue resulting from the accumulation of lactic acid due to the weakness of the body (the thinnest body), which resulted in a decline in performance and significantly, The researcher agrees with (5), saying that "possessing technical skills alone without good physical fitness is not sufficient to respond quickly to the possibilities of competition, and that poor physical fitness and the emergence of fatigue can negatively affect the level of the player by making his movements confused and hesitant, and in return we find that high The physical level of the player has a positive effect on his psychological and skill condition, as it makes him able to move on the field well "(18: 5), Also, the presence of fat levels in the body helps in supplying and obtaining the necessary energy for the athlete, and this was not found by the research sample. They were skinny, but some of them possessed strength. This was confirmed by (1), saying that "Fat is an important source of energy during light and moderate physical performance, as there are necessary enzymes in muscle cells to obtain energy from fatty acids by muscles. Fatty acids may come to produce energy from multiple sources as they are transferred to the muscle from the plasma by the three major fats (cholesterol - fats - free fatty acids). The muscles (plasma, fatty acids, and triglycerides) in the muscles are the main source of energy during moderate to moderate physical performance. It represents about (50%) of the total energy, while the rest is from carbohydrates (11). The athlete must also organize the process of eating food so that their weight is commensurate with the nature of the game, so the food must be integrated in terms of its elements, including all foodstuffs, which are directly proportional to the game, so the amount of food must be medium, not many, not few, because the increase in it is According to the amount of energy spent per day, the athlete's weight increased, but if the amount of energy exchange exceeds the amount of food consumed, this leads to the athlete's loss of weight, and this is what we found. When we asked the sample, their answer was about the nature of food and the intensity of high exercise, which causes a loss in the weight of the athlete. This in turn leads to a decrease in the percentage of fat in the body as well as carbohydrates, and this is incorrect. On the one hand, on the other hand, an athlete needs fats because the fuel value they supply the body outweighs both carbohydrates and proteins (12).Presentation and discussion of the contribution proportions of the thin component and its linear relationship to accumulation Lactic acid and precision performance of some basic tennis skills (1, 4).
Table 2: The correlation relationship, the contribution ratio of the thin component and its linear relationship to the accumulation of lactic acid and the accuracy of the front and back ground stroke performance in tennis

<table>
<thead>
<tr>
<th>Contribution rate R²</th>
<th>Correlation coefficient R</th>
<th>Degree of freedom</th>
<th>Value of p</th>
<th>Contribution rate</th>
<th>Fixed amount</th>
<th>Analogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.760</td>
<td>0.872</td>
<td></td>
<td>0.349</td>
<td>0.248</td>
<td>9.193</td>
<td>Lactic acid</td>
</tr>
<tr>
<td>0.266</td>
<td>0.516</td>
<td>8</td>
<td>0.062</td>
<td>2.06</td>
<td>0.038</td>
<td>Forward ground hit</td>
</tr>
<tr>
<td>0.588</td>
<td>0.767</td>
<td></td>
<td>0.211</td>
<td>0.072</td>
<td>0.767</td>
<td>Backhand hit</td>
</tr>
</tbody>
</table>

From Table (2), it is clear that the study of the search variables by the way of the wrong regression came in which the lactic acid variable was the most important variable, as his contribution rate reached (0.760). The correlation coefficient was (0.778). As for the value of his coefficient, it reached (0.248), while the value of P estimated (2.06) was at (8). The accuracy of the performance of the back ground stroke came in the second order. Its contribution rate was (0.588), with a correlation coefficient of (0.767) and with a factor of (0.072), and the third variable in the accuracy of the forward ground stroke performance came as its contribution rate was (0.266). The correlation coefficient was (0.516), and the coefficient value was (0.038). The table also explains that (80%) of the differences in total deviations in the values of the variable (y) are explained by the linear relationship to the regression model. And (20%) of the variations are due to random factors, as there were variables that were not included in the model, and on the whole the closer the value (r²) from 100%, this indicates a good fit of the model. From the above, we can obtain the following prediction equation for the thinness component in terms of lactic acid and the accuracy of the front and back ground stroke skill.

**Thinness component** = 9.193 + (lactic acid x 0.248) + (forward ground stroke +0.038) + (backhand hit x 0.072).

The researchers attribute this effect to the fact that the physical pattern represents the correct path for the organism to follow under conditions of nutrition and the absence of severe disease disorders. The determination of the original pattern requires the completion of a complete record on the ancestors and their offspring, in addition to studying the current body style and performing all available biological tests. While some scientists believe that a person has several physical patterns throughout his life on the other hand, there is almost a consensus among all of them that this relative stability exists to a great extent over the course of the athlete's life.
CONCLUSION

1- The research sample was within the component of thinness, through the mathematical community, knowing that they are Skinny, but some of them have muscle strength.

2- The skinny pattern of the sample members has brought them to a state of fatigue, and this is what we found by some of the players who got tired during the application of the tests.

3- The lactic acid variable came first in the linear relationship to estimate the thinnest component. After him Backhand hit came second. And then the forward ground stroke in third place.

RECOMMENDATIONS

1- Study other body measurements and patterns for the individuals in the research sample and the rest of the body pattern variables to stand up on the other most important problems

2- Approving periodic tests for the sample members of the tennis game and for other games to find out the most important Body mass indicators.

ETHICAL CLEARANCE

The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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