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## 1. INTRODUCTION

The modern era witnessed remarkable development in various fields including sports where breaking records and developing achievements became a feature of the time. And the effectiveness of gymnastics among the sports included in this development and the improvement of performance in gymnastics reached to the point of miracles. The development in gymnastics is the result of the progress made at the technical and research levels that helped athletes to perform difficult and complex skills.

Different gymnastic devices require different skills and complex structures such as rotations, weights, jumps and successive flips in the air (Shehata, 2003; Hantoush, 1985). It is necessary for coaches to formulate and develop comprehensive training curricula to develop most of these skills. Therefore, the difficulty and complexity in learning gymnastics skills and reaching a good level of performance requires convergence of all factors involved in preparation and implementation. Achieving a satisfactory level of performance depends not only on increasing the educational or training units, but also on providing all the aids to contribute to discovering the technical errors that the gymnast make (Ahmed & Abdel Razzaq, 1979; Yaqoub & Abdel Basir, 1971).

The interest in the youngsters is the basis in the sport of gymnastics, where the level of technical performance of the players has reached an advanced and large extent. Only more than one player and player in the world tournaments has obtained full degrees with a decrease in their age rate, and this is what makes it imperative for coaches to pay attention to the juniors and prepare them correctly based on scientific foundations (Shehata, 1992).

Biochinamatic is one of the sciences through which the best results were achieved in the field of sport of higher levels, as it provides with accurate information. It is one of the best scientific methods that contribute to achieving the goals of motor skills. Each skill has a goal that the player seeks to achieve and this goal constitutes the basis by which we can classify skills in general. Achieving this goal is related to the Biochinamatic foundations of the particular skill and its suitability (Al-Hashemi 1999; Hossam Al-din, 1993). Biochinamatic is concerned with the

## Research Article

# Relation Of Some Biochinamatic Changes With The Level Of Conducting Artistic Skills On The Ground Mat Movements Of The Junior Gymnasts In Erbil

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## ABSTRACT

The study aims to find out the relationship between some biochinamatic variables and the level of technical performance for a number of skills on the carpet of ground movements of gymnasts emerging in Erbil Iraq. Gymnastics need various complicated skills such as forward and backward somersaults. The biochinamatic is incorporated to address the movements and the factors of manner and forces that lead to movements. Thanks to the biomechanical analysis, the errors of athletic movements would be revealed. The results of the biomechanical analysis of the study show that there is a positive connection in the value of some biochinamatic changes to the level of artistic performance of some skills on the ground mat. The descriptive approach which suits the nature of the study has been used, and the study sample has consisted of the players of the Erbil Gymnasium team, the junior category, whose number is (4) four players. They were chosen by the deliberate method. Data collection methods like technical scientific observation, measurement, and questionnaire have been used to obtain the values of some biochinamatic variables for the players during the performance of the basic skills (front hands jump, Arab jump and posterior cardio). Additionally, the video has been recorded during the performances. The necessity to use the video as one of the objectives means that reveal the true level of the players in the performance of movement in gymnastics. The study has found a good relationship between some vital changes and the technical performance of some gymnastics skills on the ground in the front hand spring and the single back flip. The coaches may adapt the results of the study in improving the technical performance of the junior gymnasts and consider the biomechanical variables in this study.

**Key words:** Biochinamatic, Gymnastics, Biomechanical analysis, Technical performance, Kinetic analysis.

scientific aspects of the movement and its development in accordance with the physical laws of the forces affecting the movement. It works to find appropriate solutions to the kinetic action and give it the correct form. As well as determining the kinetic range of the correct method, the appropriate force and the balance require to implement and perfect the movement action (Janabi, 2007; Simonian, 1981).

The characterization movement or a part of movement should be analyzed in order to know its subtleties, its weaknesses and strengths, and to try to find the reasons for that in light of what is related to that in physical abilities or anthropometric characteristics. This process is called movement analysis. The minutes of the movement path and the relationship between the variables that affect that path is the analysis of movement (Sumaida, 1987). Movement analysis help coaches and gymnasts to find out errors and correct them.

This study aims to find out the relationship between some Biochinamatic variables and the level of technical performance for a number of skills on the carpet of ground movements of gymnasts emerging in Erbil. The study is important because it analyses identifying the most important Biochinamatic variables that are recognized by kinematic analysis of technical skills. It serves the skills required of the players which helps trainers in the training process by strengthening weaknesses and strengthening strengths in raising and developing the level of technical performance.

## 2. METHODOLOGY

The study adopted the descriptive approach due to its relevance to the nature of the study. The descriptive approach consists of studying a phenomenon or treating a problem as it exists in the present with the aim of diagnosing it, uncovering its aspects and determining the relationships between its components through the use of objective tools to collect data, analyze it, and interpret its results (Shawk & Kubaisi, 2004).

### 2.1. The Study Sample

The sample is the group that is examined or monitored and on which the experiment is carried out. It may consist of one person or two persons or more (Mahjoub, 1987). The experiment group has been deliberately chosen and has include young gymnasts of the Erbil Gymnasium team. The team consists of seven gymnasts, but four gymnasts have been selected for the study. Two gymnasts excluded due to the injury and one gymnast because of his inability to perform the skills as required. The homogeneity of the research sample has constituted depending on the chronological age, training age, height and mass, as in Table (1) and based on the variation coefficient table.

Table 1. The specifications of the research sample

Mass (kg)	Length (cm)	Age of training (Year)	Chronological age (Year)	The name	No
27	126	1.5	10	A	1
27	128	1.5	11	B	2
25	127	1	11	C	3
25	126	1	10	D	4
26	126.75	1.25	10.5	X	5
1.15	0.95	0.28	0.57	S	6
4.42	0.74	22.4	5.42	CV	7

The sample is homogeneous because the value of the coefficient of variation is less than 30%

The main experiment conducted after placing the video camera of 25 pictures per second in the same place where the second reconnaissance experiment was determined, with a height of 1.04 meters from the ground level and the focal length of the lens from the research sample during the performance of skills 5.17 meters. The method of skill performance was clarified and given to each player (3) attempts for each skill and trying the best for each skill. For statistical manipulations the SPSS system was used. They are the coefficient of variation the arithmetic mean, the standard deviation, and the simple correlation coefficient.

### 2.2. Kinematic Analysis

The Kinematic analysis is the basic focus of performance. The reason for the use of Kinematic analysis in this study is that it helps identifying weaknesses in the performance and working to correct them to raise to the desired level. Minutes seeking the best technique is one of the exact knowledges of the track with the aim of improvement and development and helps sports field workers on the discovery of mistakes and action after measuring and evaluating.

It is important to have some kind of Kinematic analysis results to have a better understanding of success. Sports movements and clarification, discuss laws and conditions for sports and development, improving sports movements

or mathematical technologies, high mathematical achievement of high levels, that Kinematic analysis is used for all problems related to Kinematic learning and higher mathematical learning.

### 2.3. Videography

Imaging from extensive means of mathematical movements to study is accurate, and some companies have devised video systems with an analysis of movement up to 5,000 cadres / cadres. These devices occupied the first place in Kinematic analysis for the following reasons.

Firstly, it increases the possibility of getting a full Kinematic analysis in digital and a patrol in a time that is 20 seconds after portraying performance. Secondly, in order to place imaging machines on a direct line with a programmer for this purpose, crude movie licenses and protection are not needed and use them more than once. Thirdly, it easy to have remote control in the photography system in both operating or changing the corners of cameras, as well as easy synchronization with other systems. That's why Biomechanical data requires the system during sports competitions, with the availability of various video shooting machine.

### 2.4. Common Analysis

Computer has become a software used in analyzing sports events through programs using pictures. Simplified is a set of computer-oriented orders for a specific purpose through procedures for several functions. When analyzing the skill by the video by the slow movement, the trainer uses the skill registration machine and features the same film itself. The second step for analysis is to register the photo collection on one page and thus realize the relationship to this group, and the computer can also display any single part through any single image or package of the body parts and the center of gravity, and can be displayed during any part of the skill and displays the time period for each. A graph, so the trainer is able to trust the players, and then the use of a computer provides relationships between many elements, which uses us in the training process.

## 3. ANALYSIS

### 3.1. Results of Biochinamatic variables For Front-Hand Jump

1. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the front hands jump (for the starting stage). There is a significant relationship between the following biochemical variables and the degree of technical performance which is approach angle, right leg knee angle, angle left leg knee, hip angle. Through the above, it becomes clear that the angle of approach has a high moral correlation with the degree of performance, and this is explained by the opinion which says the greater the angle of approach, the better the player's performance. Because the higher the angle of approach and a large degree, the higher the player's height is better. This explains the higher degree of performance that applies to the technical aspects for the optimum performance (Janabi, 2003). The consideration of increasing the knee angle means maintaining the momentum of the body generated as a result of the horizontal velocity, which positively affects the player's height in order to maintain the height of the center of gravity of the body mass, and since the small angle of the knee means a loss of momentum that was previously indicated by the researcher and this applies to the knee angle left leg (Janabi & Atia, 2002).

2. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the front hands jump (for the leaving stage). There is a significant relation between the following biochemical variables and the degree of technical performance (the angle of advancement, height of the center of gravity of the body). The significance of the relationship between the angle of advancement and the degree of technical performance of the front hand jump in the abandonment stage is that the mechanical goal of increasing the angle of advancement is to shift the direction of forces to the vertical vehicle more than it is in the horizontal vehicle (Hossam Al-Din, 1994). A significant correlation appeared between the height of the center of gravity of the body and the degree of technical performance that whenever the angle of advancement of the body was large, the height of the center of gravity of the body mass was large due to the lack of bending, i.e. the extension occurring in the knee and hip joint that led to an increase in the angle of advancement, which positively affected the height. The center of gravity of the body is more, that is, the proportion is direct between the height of the center of gravity of the body mass and the angle of advancement. (Ahmed & Murad, 1985).

3. Through the presentation of the results, it appeared that there are Biochinamatic variables that had a positive effect on the technical performance of the front hands jump (for the leaving stage). There is a significant relation between the following biochemical variables and the degree of technical performance which is (left leg knee angle, shoulder angle, and center of gravity height the body). The morale of the relation between the shoulder angle and the degree of technical performance of the front hands jump in the flight stage, where the angle was completely

open and there was no angle in the shoulder joint to affect the energy loss and a decrease in the final outcome (Zainuddin, 1999). The significance of the relation between the height of the center of gravity of the body and the degree of technical performance of the front hand jump in the flying stage is that the full performance of this skill requires the presence of a high-flying stage in which the body is curved.

The significance of the relation between the angle of the left leg's knee and the degree of technical performance of the front hands jump in the flight phase and that it is good for the body's joints in this phase to be in the case of almost complete or complete extension, including the knee angle, meaning that the body is a type three lever that emphasizes the length The resistance arm, which increases the rotational speed, according to Newton's law (Khamoun).

4. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the technical performance of the front hands jump (the landing stage). There is a significant relationship between the following biochemical variables and the degree of technical performance (hip angle, left leg knee angle, and torso angle). The significance of the relationship between the angle of the left leg's knee and the degree of technical performance of the front hand jump in the landing stage to the positive reflection that is generated as a result of the extension of the hip angle joint, so that the extension that occurred at the hip angle and also the whole knee angle works on the better performance of the player's movement and this is confirmed by Technical performance (Rashid, 2004). The significance of the relationship between the angle of inclination of the trunk and the degree of technical performance of the front hand jump in the landing stage until the angle of inclination was close to (45) degrees because the technical performance specifications of the skill confirm that the shoulders and torso are not perpendicular to the hands at the moment of landing (Hall, 1995).

### 3.2. Results of Vital Variables from Front-End Hand Jump Skill (General Variables)

Through the presentation of the results, it appeared that there are Biomechanics variables that positively affected the level of technical performance of the front hands jump (general variables), and this was evident through the significant correlation coefficient, meaning there is a significant relationship between Biochinamatic variables (for total performance time and horizontal displacement) and the degree of technical performance.

The significance of the relationship between the total time of performance and the degree of technical performance of the front hands jump to the general variables shows that the proper and good performance that the player performs when he works on the movement performance with a correct technique and by opening the corners of the joints of the body, this work leads to an increase in time, but in relative any proportion to the technical performance.

The optimal and correct one according to the rules of proper performance in motor performance, and this is directly proportional to the total horizontal displacement. The longer the period of performance is relatively long and the technical performance is sound, then the horizontal displacement is greater, and this confirms the scientific logic that says. The flow of movement, that is, the angular velocity of the joints of the body, the difference is small. With it when moving from one place to another, all this leads to the player obtaining the best horizontal displacement of the movement (Abdel Moneim, 1977).

Table 2. It shows the arithmetic mean, standard deviations, calculated and tabular (t) value, and the significance of the biochemical variables of the front hands jump skill (general variables)

Indication	R. Calculated	S	X	measuring unit	Biochemical variables	No
incorporeal	0.97(*)	0.03	44	a second	Total performance time	1
incorporeal	0.96(*)	24.24	207.75	Centimeter	Horizontal displacement	2
-	-	0.70	8.00	point	the performance	3

tabular value of (t) in front of the degree of freedom (2) and below the level of significance (0.05) = 0.95

### 3.3. Results of Biochinamatic Variables for Arab Jump Skill

1. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the Arab jump (the initiation stage). There is a significant relationship between the following biochemical variables and the degree of technical performance (right leg knee angle, left leg knee angle, Torso angle and shoulder angle). The morale of the relationship between the angle of inclination of the trunk and the degree of technical performance; the greater this angle, the lower the center of gravity of the body and the help of the body to maintain its height, which reflects positively on the speed of performance and this is a good and positive thing (Abu Ella, 1977). As for the angle of the shoulder, the body whenever its final joints are elongated helps in good movement and thus the fluid increase in the joints of the body, which is reflected positively on the rotational kinematic speed of the performance (Al-Azzawi, 1988).



2. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the Arab jump (pre-Turk phase). There is a significant relationship between the following biochemical variables and the degree of technical performance, which is (right leg knee angle, leg knee angle left arm, torso angle, left arm elbow angle, and body center of gravity height). The morale of the relationship between the angle of the right leg knee and the degree of technical performance of the Arab jump in the pre-quitting stage to the player's attempt to obtain the lowest drop in the center of gravity of the body in order to take advantage of the tide in the left and right knee because the player will work to shift the speed from the horizontal to the likeness of the vertical (Wsenk, 1983). As for the angle of the left arm elbow, the body whenever its final joints are elongated helped for good mobility and thus the fluid increase in the joints of the body, which is reflected positively on the rotational motor speed of the performance.

3. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the Arab jump (the leaving phase). There is a significant relationship between the following biochemical variables and the degree of technical performance (the angle of advancement, the angle of inclination of the trunk, the angle of the shoulder, hip angle). The morale of the relationship between the angle of advancement and the degree of technical performance of the Arab jump in the abandonment stage, that the greater the angle of advancement, the better the kinetic transmission in order for the player to obtain a dynamic extension in the body joints (Abdul Basir, 1900).

4. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the Arab jump (the flight stage). There is a significant relationship between the following biochemical variables and the degree of technical performance (the angle of the right leg knee, the angle of inclination of the trunk, hip angle, height of the body's center of gravity). It is logical to say that the greater the tide of the joints of the body leads to a rise in the center of gravity of that body mass, so it is noted that the breakthrough in the angle of the knee as well as the breakout at the angle of the hip, which reflected positively on the breakthrough at the angle of inclination of the trunk and ultimately leads to a rise in the center of gravity of the body mass in order to obtain on the straightening of the joints of the body to reflect positively on the total forward displacement (Barham, 1995).

5. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the Arab jump (the landing stage). There is a significant relationship between the following biomechanical variables and the degree of technical performance which is (right leg knee angle, landing angle, inclination angle Torso, shoulder angle, hip angle). The morale of the relationship between the angle of a right leg's knee and the degree of technical performance of the Arab jump in the stage of descent to prepare in order to absorb the force that the earth will shed on the body as a result of the reaction (Hantoush & Saudi, 1988).

### 3.4. Results of Biochinamatic Variables for Arab Jump Skill (General Variables)

Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the Arab jump (general variables), and this was evident in the significant correlations coefficient. The presence of a significant relationship between the following Biochinamatic variables and the degree of technical performance, namely (Total performance time, horizontal shift).

The emergence of the significance of the relationship between the total time of performance and the degree of technical performance of the Arab leap in the general variables that it is difficult to accurately determine the time of the skill performance of any gymnastic movement in an accurate manner and the time measurement in this case is a relative measure. But if the performance was in a shorter time and with the same displacement, then this may be good and it is possible to count that on the variables whose significance appeared with the degree of performance that was mentioned earlier for this movement. The total horizontal displacement and its comparison with time we see that the relationship is positive, but if the performance is in a lesser time and with the same displacement, then this may be good (Lyrch, 1973).

Table 3. It shows the arithmetic mean, standard deviations, calculated and tabular (t) value, and significance of the variables Biomechanics of the Arab Jump skill (general variables)

Indication	R. Calculated	S	X	measuring unit	Biochemical variables	No
incorporeal	0.99(**)	0.03	1.23	a second	Total performance time	1
incorporeal	0.97(*)	9.11	192.95	Centimeter	Horizontal displacement	2
-	-	0.64	8.25	point	the performance	3

The tabular value of (t) in front of the degree of freedom (2) and below the level of significance (0.05) = 0.95

### 3.5. Results of Biochinamatic variables for causative rear pneumatic switch



1. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the posterior cardiomyopathy (rise stage). There is a significant relationship between the following biomechanical variables and the degree of technical performance which is (the angle of rise, the angle of the right leg knee, and height of the body's center of gravity). The significance of the relationship between the angle of advancement and the degree of technical performance of the rear air flip skill developed in the abandonment stage that the mechanical goal of increasing the angle of advancement is to shift the direction of forces to the vertical vehicle more than it is in the horizontal vehicle, which ultimately works to increase the angle of departure and the speed of departure (Abdel Jabbar, 1989).

2. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the recurrent back cardiac performance in the (flight stage). There is a significant relationship between the following biochemical variables and the degree of technical performance (angle of inclination of the trunk, hip angle and the height of the body's center of gravity). The significance of the relationship between the angle of inclination of the trunk and the degree of technical performance of the posterior air pipe developed in the flight phase is that whenever the angle of inclination of the trunk is small, then this worked to show an arc in the back. The morale of the relationship between the height of the center of gravity of the body and the degree of technical performance of the posterior cardiomyopathy in the stage of flight to good propulsion in the feet as well as balling (Najah, 2001; Hussein, 1977).

3. Through the presentation of the results, it appeared that there are Biochinamatic variables that had a positive effect on the technical performance of the recurrent posterior cardiac performance in (the decline stage). There is a significant relationship between the following biochemical variables and the degree of technical performance (angle of inclination of the trunk, angle of the hip). Scientist of the Newton's law who says for every action there is an equal and opposite reaction in the direction and it is the third law for reaction, that is, whenever the player tries to reduce the force of collision with the ground, by bending the joints of the body at the moment of landing, the impact of the ground reaction is less, so the landing is correct and the performance is good. The significance of the relationship between the hip angle and the degree of technical performance of the rear rotating aerobic skill in the landing stage is that reducing the hip angle makes the player in control of all parts of his body at the moment of landing (Model, 1988; Hussein, 1998).

### **3.6. Results of Biochinamatic Variables for Causative Rear Pneumatic Switch**

1. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the performance of the posterior cardiomyopathy (rise stage). There is a significant relationship between the following biomechanical variables and the degree of technical performance which is (the angle of rise, the angle of the right leg knee, and height of the body's center of gravity). The significance of the relationship between the angle of advancement and the degree of technical performance of the rear air flip skill developed in the abandonment stage that the mechanical goal of increasing the angle of advancement is to shift the direction of forces to the vertical vehicle more than it is in the horizontal vehicle, which ultimately works to increase the angle of departure and the speed of departure (Abdel Jabbar, 1989).

2. Through the presentation of the results, it appeared that there are Biochinamatic variables that positively affected the level of technical performance of the recurrent back cardiac performance in the (flight stage). There is a significant relationship between the following biochemical variables and the degree of technical performance (angle of inclination of the trunk, hip angle and the height of the body's center of gravity). The significance of the relationship between the angle of inclination of the trunk and the degree of technical performance of the posterior air pipe developed in the flight phase is that whenever the angle of inclination of the trunk is small, then this worked to show an arc in the back. The morale of the relationship between the height of the center of gravity of the body and the degree of technical performance of the posterior cardiomyopathy in the stage of flight to good propulsion in the feet as well as balling (Najah, 2001; Hussein, 1977).

3. Through the presentation of the results, it appeared that there are Biochinamatic variables that had a positive effect on the technical performance of the recurrent posterior cardiac performance in (the decline stage). There is a significant relationship between the following biochemical variables and the degree of technical performance (angle of inclination of the trunk, angle of the hip). Scientist of the Newton's law who says for every action there is an equal and opposite reaction in the direction and it is the third law for reaction, that is, whenever the player tries to reduce the force of collision with the ground, by bending the joints of the body at the moment of landing, the impact of the ground reaction is less, so the landing is correct and the performance is good. The significance of the relationship between the hip angle and the degree of technical performance of the rear rotating aerobic skill in the

landing stage is that reducing the hip angle makes the player in control of all parts of his body at the moment of landing (Model, 1998; Hussein & Shaker, 1998).

### 3.7. Results of the Biochinamatic Variables Of The Posterior Cardiac Rotational Skill (General Variables)

Through the presentation of the results, it appeared that there are Biochinamatic variables that had a positive effect on the technical performance of the recurrent background cardiac performance in the (general variables) and this was evident through the significant correlation coefficient below, i.e. there is a significant relationship between the following Biochinamatic variables and the degree of technical performance, namely Total performance time, horizontal shift.

The reason for the significance of the relationship between the total time of performance and the degree of technical performance of the Arab jump in the general variables is that the good sound performance that the player performs when he works on the performance of the movement with a correct technique and by opening the corners of the body joints, this work will lead to an increase in time, but relatively and it is difficult to determine the time of the skillful performance of any movement and accurately, that is, the measurement in this case is a relative measurement, and this relative measurement has positively reflected on the horizontal displacement of the movement and this is the result of good skill performance and the player's commitment to maintaining the laws of motor performance in terms of good performance and this is confirmed by Saudi Amer (Ahmed, 1981).

Table 4. It shows the arithmetic mean, standard deviations, calculated and tabular (t) value, and significance of the variables Biomechanics of the Posterior Arrhythmic Jump Skill general variables

Indication	R. Calculated	S	X	measuring unit	Biochemical variables	No
incorporeal	0.99(**)	0.04	1.23	a second	Total performance time	1
incorporeal	0.96(*)	12.92	108.01	Centimeter	Horizontal displacement	2
-	-	0.64	8.25	point	the performance	3

The tabular value of (t) in front of the degree of freedom (2) and below the level of significance (0.05) = 0.95

## 4. CONCLUSION AND RECOMMENDATIONS

Through the intangible results extracted from the study and in light of these results and according to the studying objectives, the following conclusions were reached:

The presence of significant relationships between some Biochinamatic variables and the level of technical performance of some skills in gymnastics on the ground movement mat device (front hand jump, Arab jump, recurrent back air heart). The presence of significant relationships between some Biochinamatic variables and the degree of technical performance in the skill of the front hands jump for each of (the initiation stage, the abandonment stage, the flight stage, the landing stage, and the general variables). The presence of significant relationships between some Biochinamatic variables with the degree of technical performance in the skill of the Arab jump for each of (the initiation stage, pre-abandonment, abandonment stage, flight stage, landing stage and general variables). The presence of significant relationships between some Biochinamatic variables with the degree of technical performance in the skill of the recessive air core for each of (the leaving phase, the flight phase, the landing phase and the general variables).

In light of the conclusions reached by the study, it recommends the necessity of adopting the results of the study and taking it into account in the training of junior teams in the gymnasium and the dependence of coaches on the results of the study in improving the level of technical performance of junior gymnasts and emphasizing the trainers of this activity and at these ages, considering the Biochinamatic variables in this study. The necessity of using videography as one of the objectives means that reveal the real level of the players in the movement performance in your gymnastics and conduct such a study on different age groups and conduct such a study on various other gymnastic devices.

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