The effect of exercises according to Laban's classification to develop some kinematic variables in some squash skills among juniors' players at the Private Squash Academy aged (15-13)

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Abstract

The research aimed to prepare special exercises according to the Laban classification to develop some variables for the game of squash for juniors and to identify the effect of special exercises prepared according to the Laban classification to develop some kinematic variables for the game of squash for juniors. The two researchers used the experimental method with two equal experimental and control groups for its suitability and the nature of the problem to be solved. The research community was chosen in a deliberate manner, represented by emerging players in the Private Squash Academy affiliated with the Central Iraqi Squash Federation, who numbered (16) players for the sports season (2023-2024 AD), and they represent the research sample. They were divided randomly and by lottery into two equal groups, experimental and control, at a rate of (8) Players for each group. Thus, the sample represents 100% of the original population, which is a truly representative percentage of the population. One of the most important results reached by the two researchers is that: The exercises prepared according to the Laban classification have a positive effect on the kinematic variables under study in the basic skills in the sport of squash among junior players in the Iraqi Special Squash Academy aged (13-15) years, and one of the most important goals of sustainable development that Backed by research is good health and well-being. and this achieves one of the sustainable development goals of the United Nations in Iraq which is (Quality Education)

Keywords	Laban classification, kinematic variables, squash players

Introduction:

Kinetic exercises are one of the important things in the kinetic learning process through progression and according to the difficulty of the skill to be learned. The various and different exercises help players learn the skills in a faster time and with less effort. Exercises are among the means used in kinetic learning and sports training, as their selection requires care so that they are similar in their formations, compatibility, and direction of work with the type of kinetic skill practiced during play, because exercises are specialized tools that the coach relies on to speed up progress and ensure the achievement of the goals set for the curriculum. The learning process is considered the cornerstone on which a good sports base is built with a fruitful future full of achievements, especially when this process is of a scientific, academic nature that keeps pace with modern development, in accordance with the use of various methods that have a clear and prominent role in raising the level of technical performance of players for the better, especially when it comes to The matter is for young people, as players at this stage need more knowledge and greater awareness in order to discover what surrounds them to prove their kinetic and physical abilities to the best level of performance. Laban's classification, as (Ghanem) mentioned, is one of the classifications that accurately describe the

body's movements through concepts that tell us what the whole body or part of it does, what the movement does and its dynamic nature, and what the interaction is between people, things, and the environment (1).

He mentions (Hassan). (Laban's classification enables the learner to be able to manage body movements in effective ways that interact to achieve the desired goals and which pave the way for reaching the best level of learning various sports skills) (2).

The importance of biomechanics is no secret to anyone, as it is one of the sciences that contribute to the scientific progress of kinetic performance in particular and sports in general, and the main content of this science in the field of physical education includes studying the causes of movement, that is, it is concerned with studying the internal and external forces that cause movement, and provides the most appropriate kinetic solutions using it. For kinetic analysis, which constitutes the initial hypotheses and premises of scientific relevance to guide the sports coach in various sporting events, especially racket sports events, where most modern scientific studies, along with what (Al-Hashemi) mentioned, have confirmed the importance of kinetic analysis, which depends on discovering strengths and weaknesses and trying to find the reasons for This is in addition to the negative and positive influences that affect the movement in light of the associated physical capabilities or anthropometric specifications, taking into account the goal to be achieved by the movement. (3).

Squash is one of the racket games, and its method of playing is "chasing," which is intended to chase the opponent in addition to chasing the ball. It is played day and night, in summer and winter. Perhaps the most important thing that distinguishes this game is the distinct pleasure felt by the players who practice it, and this is what adults and children call upon. Both genders can play it, and this game is characterized by forcing its players to move continuously by exchanging balls. It is characterized by a direct challenge and requires vigilance, care, and correct expectation on the part of the player to keep up with the opponent during the exchange of balls.

Squash is one of the games that gives the individual high physical fitness by combining speed, strength, and endurance, and the kinetic coordination, agility, and flexibility it achieves for the player, giving him a great scope for fun and recreation. It was found that practicing 30 minutes of playing squash is equivalent to practicing 2 hours of tennis, as well as 3 hours of golf, through research. It was conducted on professional players in 1985, which indicates that squash is one of the games in which the player puts in a lot of effort while playing.

The importance of the research lies in preparing special exercises according to Laban's classification to develop some kinematic variables for the game of squash for juniors, which help in good correlation to learn the correct performance, develop it, master it, and reach the mechanism in a game that depends on awareness of place, time, and kinetic and cognitive aspects against a competitor in a small closed court. This is for the purpose of excitement and desire among beginner players and to save time and effort.

Due to the specificity of the research sample, if it is from a young age group, we must find exercises that help in developing movement and its awareness, since this group is the basis for learning these special skills, and the greater the learner's awareness and understanding of movement, the faster the response to movement in all its dimensions and the greater the speed of learning it.

Through the researchers' follow-up to the training units for junior players at the Private Squash Academy, they found that most of the players who move from one age stage to another have a lack and weakness, which is reflected in their performance and achievements in the future. The reason for this may be the weakness resulting from a lack of interest in the kinematic variables that qualify the player to perform. The skills and achievement required of him, in addition to the trainers not relying on exercises that achieve the principle of balance.

Therefore, the two researchers decided to delve into this problem by preparing special exercises according to Laban's classification to develop some kinematic variables for the game of squash for juniors through this classification in all its dimensions, awareness of the body, awareness of space, awareness of the type of movement, and

relationships regarding with whom the body moves.

Research objective:
- Preparing exercises according to Laban's classification to develop some kinematic variables for players' squash skills.
- Identifying the effect of exercises according to Laban's classification in developing some kinematic variables of squash skills among emerging players at the Private Squash Academy aged (13-15).
- Identifying the differences between the experimental and control groups in some kinematic variables of squash skills among emerging players at the Private Squash Academy aged (13-15).

Research hypotheses:
- There are no statistically significant differences between the pre- and post-tests in some kinematic variables of squash skills among emerging players at the Private Squash Academy aged (13-15).
- There are no statistically significant differences between the experimental and control groups in some kinematic variables of squash skills among emerging players at the Private Squash Academy aged (13-15).

Research fields:
- Human field: For junior players at the Private Squash Academy aged (13-15) years.
- Time field: (12/9/2023) to (10/1/2024)
- Spatial field: Squash courts at the College of Physical Education and Sports Sciences, University of Baghdad / Al-Jadriya.

Definition of terms:
Laban's classification: The classification developed by the scientist Rudolf Laban to organize the topics of movement, represented by four elements, is one of the systematic methods for describing movement.

Research Methodology:
In solving their problems, all scientific research resorts to choosing a method that suits the nature of the problem. Accordingly, the two researchers used the experimental method with two equal experimental and control groups to suit it and the nature of the problem to be solved. (Hadeel, & Dr. Suhad) "The experimental method represents the most honest approach to solving many problems." Scientific problems in a practical and theoretical manner" (11)

Community and sample research:
The research population was chosen in a deliberate manner, represented by emerging players in the Private Squash Academy affiliated with the Central Iraqi Squash Federation, who numbered (16) players for the sports season (2023-2024), and they represent the research sample. They were divided randomly and by lottery into two equal groups, experimental and control, at a rate of (8) Players for each group. Thus, the sample represents 100% of the original population, which is a truly representative percentage of the population.

Sample homogeneity:
Before starting to implement the tests and special exercises prepared by the researchers, and in order to control the variables that affect the accuracy of the research results, the researchers resorted to verifying the homogeneity of the research sample in the variables related to anthropometric measurements, which are (height, mass, and chronological and training age), and as the table shows (1).

Table .1 shows the arithmetic mean, standard deviation, and value of the skewness coefficient for the research sample

No.	Variables	measruing unit	Mean	Median	Std. Deviations	Skewness
1	height	cm	143.06	143.5	3.69	-0.358
2	mass	kg	44.3	45	3.40	-0.618
3	Chronological age	year	14.14	14.00	0.71	0.592
4	Training age	year	1.96	1.87	0.49	0.551

Table (1) shows the values of the arithmetic mean, the standard deviation, and the skewness coefficient for the research variables. The values of the means are greater than the standard deviations, and this indicates that there is no dispersion among the members of the research sample, as the values of the skewness coefficient ranged between (0.358 to -0.551). That is, it was limited to (±1), which indicates that it is within the moderate trend.

Equivalence between the two research groups:
After performing the logical calculation of all variables for the study and for all (16) players, the equivalence process should be carried out before starting to apply the special exercises, as the two researchers resorted to verifying the equivalence of the experimental and control groups, (Hadeel, & Dr. Suhad) "as the researcher should form groups Equivalent at least with regard to the variables that are related to the research" (11), and in order to control the variables that affect the accuracy of the study results and to attribute the differences in influence only to the independent variable, the two researchers used a T-test for two independent samples on the raw results. In the pre-test for all variables investigated in the study, it shows the calculation of the equivalence process between the studied variables with regard to the kinematic variables related to the performance angles when applying their tests, as shown in Table (2).

Table .2 shows the equivalence procedure mediated by statistical operations for kinematic variables

Variables	Measuring unit	Experimental group Pre-test		Control group Pre-test		T value Calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Angle of inclination of the body in the server from the right	Degree	19.25	1.03	20.37	3.62	-0.845	0.413	Non sig
Server's shoulder angle is from the right	Degree	78.37	2.32	78.25	1.58	0.126	0.902	Non sig
Angle of the forearm of the server is from the right	Degree	134.12	1.35	133.62	2.13	0.559	0.585	Non sig
Angle of inclination of the body in the server from the left	Degree	20.50	0.92	20.25	1.48	0.403	0.693	Non sig
Server's shoulder angle is from the left	Degree	77.12	2.58	76.12	2.03	0.860	0.404	Non sig

Angle of the forearm of the server is from the left	Degree	125.62	2.50	124.87	1.35	0.745	0.469	Non sig
Angle of inclination of the body in the forehand	Degree	28.62	1.40	27.87	1.45	1.047	0.313	Non sig
Shoulder angle in the forehand	Degree	30.00	1.30	29.00	1.30	1.528	0.149	Non sig
Forearm angle in forehand	Degree	131.50	1.19	130.87	1.45	0.938	0.364	Non sig
Angle of inclination of the body in the backhand	Degree	24.25	1.03	23.50	1.60	1.111	0.285	Non sig
Shoulder angle in the backhand	Degree	44.25	1.28	43.50	1.19	1.210	0.246	Non sig
Forearm angle in the backhand	Degree	129.37	1.40	129.75	1.28	-0.557	0.586	Non sig

Significant when the significance value ≤ 0.05 under degree of freedom of 14

The results in Table (2) show that the two groups are equivalent in all kinematic variables, with no statistically significant differences between the sample members.

Field research procedures:
Choosing study variables:

After the two researchers reviewed a group of theoretical studies, the most important of which we reviewed in the second chapter, as well as reviewing the most important sources related to the study and conducting some personal interviews with coaches, teachers and experts specialized in the field of racket games, and after consulting with the supervisor and members of the scientific committee to approve the topic of the study, the study was determined. The following variables:

1- Angle of inclination of the body in the server from the right.

2- Server's shoulder angle is from the right.
3- Angle of the forearm of the server is from the right.
4- Angle of inclination of the body in the server from the left
5- Server's shoulder angle is from the left.
6- Angle of the forearm of the server is from the left.
7- The angle of inclination of the body in the forehand strike.
8- Shoulder angle in the forehand.
9- Forearm angle in forehand.
10- Angle of inclination of the body in the backhand.
11- Shoulder angle in the backhand.
12- Forearm angle in the backhand.

Choosing appropriate tests to calculate the study variables:
After the two researchers reviewed the most important studies related to the research, and

using the expertise of the supervisor, the following tests were chosen:
1- Testing the serve from the right side on the squash court.
2- Testing the serve from the left side on the squash court.
3- Straight ground forehand test.
4- Straight ground backhand test.

Exploratory experience:
The exploratory experiment is a mini-experiment of the basic (main) experiment, and it must have the conditions and conditions in which the basic experiment is in the best possible condition so that its results can be taken into account. On this basis, the two researchers and the assistant team conducted the exploratory experiment on two players from outside the sample on Saturday, September 23, 2023, on the squash courts in the courts of the College of Physical Education and Sports Sciences / University of Baghdad, at exactly three o'clock in the afternoon, as all tests were applied. As well as applying all the exercises prepared by the researchers and determining their repetitions. The purpose of the researchers conducting the exploratory experiment is to identify the following:

- Suitability of the location where the main experiment will be conducted.
- Ensure the validity of the devices and tools used in the tests.
- Determine the duties of the assistant work team.
- The logical sequence in implementing the proposed tests.
- Knowing the readiness of the survey sample to perform the tests.
- Knowing the appropriateness of the special exercises prepared for the research sample and the ease of their application.
- Identify the difficulties that the two researchers will face in the main experiment.
- Identify the time to perform each exercise and calculate the suggested repetitions.
- Determine where to place cameras perpendicular to the movement.
- Set the focal height of the cameras to 1.20 m.
- Determine the distance of cameras from the player to 3m.

- Determine the speed of the cameras, and the speed is fixed at 240 frames per second.

All notes related to this experiment have been recorded in order to avoid any error during the main experiment.

Pre-tests and measurements:
The two researchers conducted the pre-tests on Monday, September 25, 2023, taking into account the specific conditions of the test in terms of place, time, tools, and method of implementing the tests in the stadiums of the College of Physical Education and Sports Sciences/University of Baghdad, at three o'clock in the afternoon, on the research sample. Alternately, a player from the experimental group and a player from the control group, and so on, for all four tests. The sequence of tests is as follows:

First test:
- Testing the serve from the right side on the squash court (4).
- The aim of the test: to measure accuracy and learn the technique of serving from the right side of the court and analyze the kinematic variables.
- Tools and devices used: The test is conducted on the legal squash court using squash rackets and balls. The left side of the back court is divided into 3 square-shaped areas with dimensions (160 cm x 160 cm), as shown in Figure (1), which shows the evaluation marks and the laboratory parking area. When performing the test and two cameras for motion analysis.
- Test procedures: The test includes the tester to be tested standing in the right serving box. The tester stands in the correct position for the serve. After explaining the test, the tester is given (5) trial attempts after a warm-up to learn how to perform the test. (10) attempts are allocated to each tester. When the signal is given, the tester By sending the ball towards the divided goal, and the test requires that the serve be correct.
- Scoring: Points are calculated for each correct serve as follows:
- 3 points if the ball touches square 3.
- 2 points if the ball touches square 2.

- 1 point if the ball touches square 1.
- Zero if it is outside the specified limits.

Note: If the ball falls on one of the common lines, points are calculated for the square with the highest score.
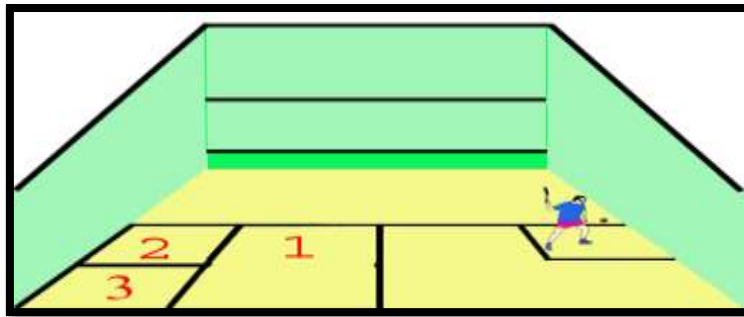
Figure (1)
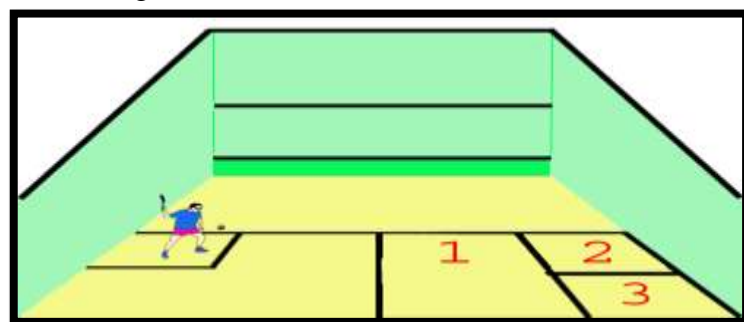Shows how to perform the test and divides the playing field

Second test:
- Testing the serve from the left side on the squash court. (4)
- The aim of the test: to measure accuracy and learn the technique of serving from the left side of the court and analyze the kinematic variables.
- Tools and devices used: The test is conducted on the legal squash court using squash rackets and balls. The right side of the back court is divided into 3 square-shaped areas with dimensions (160 cm x 160 cm), as shown in Figure (2), which shows the evaluation marks and the laboratory parking area. When performing the test and two cameras for motion analysis.
- Testing procedures: The test includes the tester to be tested standing in the left transmission box, where the tester stands in the correct position for the transmission, and after explaining the test, the tester is given (5) experimental attempts after a warm-up to learn how to perform the test, and (10) attempts are allocated to each tester, and when the signal is given, the tester By sending the ball towards the divided goal, and the test requires that the serve be correct.

- Scoring: Points are calculated for each correct serve as follows:
- 3 points if the ball touches square 3.
- 2 points if the ball touches square 2.
- 1 point if the ball touches square 1.
- Zero if it is outside the specified limits.

Note: If the ball falls on one of the common lines, points are calculated for the square with the highest score.

Figure (2)
Shows how to perform the test and divides the playing field

Third test:
- Straight ground forehand test (4)
- The aim of the test: to measure the accuracy of learning the straight forward stroke in squash and to analyze the kinematic variables.

- Tools and devices used: The test is conducted on a legal squash court using squash rackets and balls. Three specific areas are drawn on the court floor from the right side of the court with measurements of (160 x 160) cm. Figure (3) shows the evaluation marks, the testers'
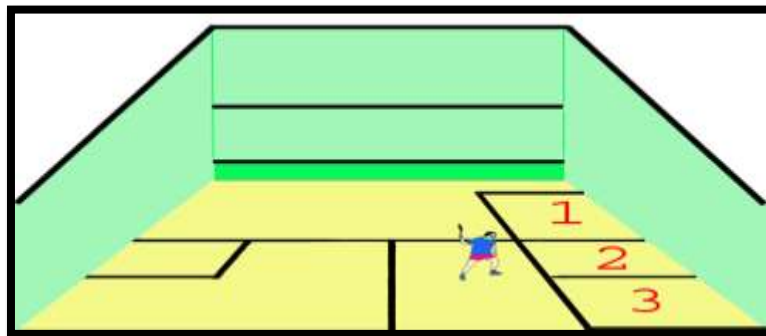
standing area, how the test is conducted, and two cameras for motion analysis.

- Test procedures: The test includes the tester to be tested standing in an area next to the serving area, facing the right side wall, taking the correct position for the forehand. After explaining the test, the tester is given (5) experimental attempts after the warm-up to learn how to perform the test. Each player is allocated (10) attempts. He begins by hitting the ball continuously towards the divided goal. The tester is required to hit the ball after it hits

the ground, otherwise it will be considered invalid.

- Scoring: Points are calculated for each correct serve as follows:
- 3 points if the ball touches square 3.
- 2 points if the ball touches square 2.
- 1 point if the ball touches square 1.
- Zero if it is outside the specified limits.

Note: If the ball falls on one of the common lines, points are calculated for the square with the highest score.

Figure (3)
Shows how to perform the test and divides the playing field
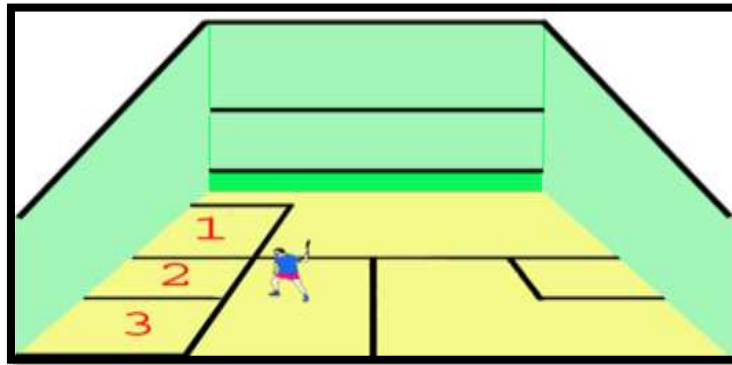
Fourth test:
- Straight ground backhand test (4).
- The aim of the test: to measure the accuracy of learning the straight backhand stroke in squash and to analyze the kinematic variables.
- Tools and devices used: The test is conducted on a legal squash court using squash rackets and balls. Three specific areas are drawn on the court floor from the right side of the court with measurements of (160 x 160) cm. Figure (4) shows the evaluation marks, the testers' standing area, how the test is conducted, and two cameras for motion analysis.
- Test procedures: The test includes the tester to be tested standing in an area next to the server area on the left side, facing the left side wall, taking the correct position for the backhand.

After explaining the test, the tester is given (5) experimental attempts after a warm-up to learn how to perform the test. Each player is allocated (10) attempts. He begins by hitting the ball continuously towards the divided goal. The tester is required to hit the ball after it hits the ground, otherwise it will be considered invalid.

- Scoring: Points are calculated for each correct serve as follows:
- 3 points if the ball touches square 3.
- 2 points if the ball touches square 2.
- 1 point if the ball touches square 1.
- Zero if it is outside the specified limits.

Note: If the ball falls on one of the common lines, points are calculated for the square with the highest score.

Figure (4)
shows how to perform the test and divide the playground areas

Methods calculate kinematic variables:
The kinematic variables are calculated through the following:
1- Angle of inclination of the body in the server from the right: It is the angle between the line descending vertically at the point of the hip and the line passing through the middle of the torso, as shown in Figure (5) at the moment of hitting the ball.

Figure (5)
Shows the angle of inclination of the body in the server from the right

2- Server's shoulder angle is from the right. This is the angle between the torso and the upper arm now of serving, as shown in Figure (6).

Figure (6)
Shows the Server's shoulder angle is from the right

3- Angle of the forearm of the server is from the right: It is the angle between the line of the forearm and the racket at the moment of hitting the serve from the right side, as in Figure (7).

Figure (7)
shows the angle of the forearm in the serve from the right

4- Angle of inclination of the body in the server from the left : It is the angle between the line descending vertically at the point of the hip and the line in the middle of the torso, as shown in Figure (8) at the moment of hitting the ball.

Figure (8)
shows the angle of inclination of the body in the transmitter from the left side

5- Server's shoulder angle is from the left: It is the angle between the torso and the upper arm at the moment of serving, as shown in Figure (9).

Figure (9)
shows the Server's shoulder angle is from the left

6- Angle of the forearm of the server is from the left: This is the angle between the forearm line and the racket at the moment of serving, as in Figure (10).

Figure (10)

shows the angle of the forearm of the server is from the left

7- The angle of inclination of the body in the forehand strike: It is the angle between the line descending perpendicular to the point of the hip and the line passing through the middle of the torso, as shown in Figure (11) in the forehand.

Figure (11)

shows the angle of inclination of the body in the forehand strike

8- Shoulder angle in the forehand: It is the angle between the torso and the upper arm in the forehand, as in Figure (12)

Figure (12)

shows the Shoulder angle in the forehand

9- Forearm angle in forehand: It is the angle between the line of the forearm and the racket in the forehand, as in Figure (13).

Figure (13)
shows the Forearm angle in forehand

10- Angle of inclination of the body in the backhand: It is the angle between the line descending perpendicular to the point of the hip and the line passing through the middle of the torso, as shown in Figure (14) in the backhand.

Figure (14)
shows the Angle of inclination of the body in the backhand

11- Shoulder angle in the backhand: It is the angle between the torso and the upper arm in the backhand, as in Figure (15).

Figure (15)
shows the Shoulder angle in the backhand

12- Forearm angle in the backhand: It is the angle between the line of the forearm and the racket in the backhand, as in Figure (16).

Figure (16)
shows the Forearm angle in the backhand

Post-tests and measurements:

After the end of the special exercises period on Wednesday, November 22, 2023, the two researchers conducted the post-test on the research sample on Saturday, November 25, 2023, at three o'clock in the afternoon, taking into account the same conditions as during the pre-test, as the two researchers were keen to prepare the same conditions for the tests chosen from In terms of time, place, and the supporting work team, that is, unifying the procedures (in the pre- and post-tests), tools, and devices in order to control the variables as much as possible, and repeating the tests in the sequence that took place in the pre-test at the end of the experiment, the results were analyzed for the selected variables to be balanced with the pre-test.

Statistical methods: The search data was processed through the Statistical Package for the Social Sciences (SPSS).

Results and discussion:
Presentation and discussion of the pre-post results of the kinematic variables of the experimental group:

Table .3 shows the significance of the differences between the pre- and post-tests regarding the kinematic variables for the experimental group

Variables	Measuring unit	Experimental group Pre-test		Experimental group Post-test		T value Calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Angle of inclination of the body in the server from the right	Degree	19.25	1.03	23.75	1.28	5.612	0.001	Sig
Server's shoulder angle is from the right	Degree	78.37	2.32	90.75	1.28	18.95	0.000	Sig
Angle of the forearm of the server is from the right	Degree	134.12	1.35	137.75	1.38	5.800	0.001	Sig

Variable	Unit	Pre mean	Pre SD	Post mean	Post SD	T value	Sig	Type
Angle of inclination of the body in the server from the left	Degree	20.50	0.92	24.12	1.45	5.333	0.001	Sig
Server's shoulder angle is from the left	Degree	77.12	2.58	88.50	1.60	15.07	0.000	Sig
Angle of the forearm of the server is from the left	Degree	125.62	2.50	136.25	2.12	13.27	0.000	Sig
Angle of inclination of the body in the forehand	Degree	28.62	1.40	35.00	1.51	7.202	0.000	Sig
Shoulder angle in the forehand	Degree	30.00	1.30	34.75	1.28	10.48	0.000	Sig
Forearm angle in forehand	Degree	131.50	1.19	135.25	1.03	8.275	0.000	Sig
Angle of inclination of the body in the backhand	Degree	24.25	1.03	29.25	1.03	7.977	0.000	Sig
Shoulder angle in the backhand	Degree	44.25	1.28	47.87	1.45	4.408	0.003	Sig
Forearm angle in the backhand	Degree	129.37	1.40	135.12	1.24	8.876	0.000	Sig

Significant when the significance value ≤ 0.05 under degree of freedom of 7

Presentation and discussion of the pre-post results of the kinematic variables of the control group:

Table .4 shows the significance of the differences between the pre- and post-tests regarding the kinematic variables for the control group.

Variables	Measuring unit	Control group Pre-test		Control group Post-test		T value Calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			

Angle of inclination of the body in the server from the right	Degree	20.37	3.62	21.12	0.99	0.574	0.584	Non sig
Server's shoulder angle is from the right	Degree	78.25	1.58	88.87	1.24	15.06	0.000	Sig
Angle of the forearm of the server is from the right	Degree	133.62	2.13	135.75	1.03	2.959	0.021	Sig
Angle of inclination of the body in the server from the left	Degree	20.25	1.48	22.62	1.06	6.333	0.000	Sig
Server's shoulder angle is from the left	Degree	76.12	2.03	85.50	1.19	9.741	0.000	Sig
Angle of the forearm of the server is from the left	Degree	124.87	1.35	134.00	1.06	13.17	0.000	Sig
Angle of inclination of the body in the forehand	Degree	27.87	1.45	33.25	1.66	5.813	0.001	Sig
Shoulder angle in the forehand	Degree	29.00	1.30	31.50	0.92	6.614	0.000	Sig
Forearm angle in forehand	Degree	130.87	1.45	134.62	1.18	5.557	0.001	Sig
Angle of inclination of the body in the backhand	Degree	23.50	1.60	25.75	1.28	4.277	0.004	Sig
Shoulder angle in the backhand	Degree	43.50	1.19	45.50	0.92	4.320	0.003	Sig

Forearm angle in the backhand	Degree	129.75	1.28	133.62	1.40	7.059	0.000	Sig

Significant when the significance value ≤ 0.05 under degree of freedom of 14

Presentation and discussion of the post-post results of the kinematic variables for the experimental and control groups:

Table .5 shows the significance of the differences between the post-post-tests on the kinematic variables for the experimental and control groups.

Variables	Measuring unit	Experimental group Post-test		Control group Post-test		T value Calculated	Level sig	Type sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Angle of inclination of the body in the server from the right	Degree	23.75	1.28	21.12	0.99	4.583	0.000	sig
Server's shoulder angle is from the right	Degree	90.75	1.28	88.87	1.24	2.966	0.010	Sig
Angle of the forearm of the server is from the right	Degree	137.75	1.38	135.75	1.03	3.266	0.006	Sig
Angle of inclination of the body in the server from the left	Degree	24.12	1.45	22.62	1.06	2.353	0.034	Sig
Server's shoulder angle is from the left	Degree	88.50	1.60	85.50	1.19	4.243	0.001	Sig
Angle of the forearm of the server is from the left	Degree	136.25	2.12	134.00	1.06	2.679	0.018	Sig
Angle of inclination of the body in the forehand	Degree	35.00	1.51	33.25	1.66	2.198	0.045	Sig

Shoulder angle in the forehand	Degree	34.75	1.28	31.50	0.92	5.814	0.000	Sig
Forearm angle in forehand	Degree	135.25	1.03	134.62	1.18	1.122	0.281	Non sig
Angle of inclination of the body in the backhand	Degree	29.25	1.03	25.75	1.28	6.009	0.000	Sig
Shoulder angle in the backhand	Degree	47.87	1.45	45.50	0.92	3.890	0.002	Sig
Forearm angle in the backhand	Degree	135.12	1.24	133.62	1.40	2.256	0.041	Sig

Significant when the significance value ≤ 0.05 under degree of freedom of 17

Discussion:

The results were shown in Table (3), which confirmed the presence of statistically significant differences between the pre-test and the post-test and in favor of the post-test in the kinematic variables. The two researchers attribute the reason for this to the use of educational exercises according to Laban's appropriate classification and with specific repetitions, and this contributes to directing the performance of these variables in a way that serves The desired goal and directing the work in a way that is appropriate to the upcoming stages of performance, by overcoming the inertia of the body and converting the potential energy into kinetic energy that is transferred from the trunk muscles to the arms, then working to transfer the weight of the body to stand on the hands in a balanced manner, as (Al-Bakri) and (Rand, & Qassim) confirm "Provided that the transfer is in light of the indicator of the momentum of each part (the mass of the part x its speed), and if the performance ends with the arms, the momentum of the torso is added to the momentum of the arms. This peculiarity represents great importance in evaluating the level of performance, whether in its early stages or in the advanced stages" (4) and (12)

The two researchers also attribute the reason for this positive development, which was achieved by members of the research sample, as they had a role in achieving that development. The exercises prepared according to Laban's classification also contributed to achieving the required distance appropriate for performing the skill, through follow-up analysis of performance and comparing it to the model. Thus, achieving the best distance between the foot and the supporting hand, which makes it easier for the student to snatch and transfer the weight of the body, as the appropriate distance plays an important role in achieving balance and flow in the movement and thus helped to perform the skill in an organized movement path, quickly and perfectly.

The effectiveness of the educational exercises according to the Laban classification, which were used in achieving an appropriate support base that is compatible with the body, works to achieve a good balance for performing the skill, by distributing the mass of the body parts in a way that achieves balance, and thus both the torso and the foot will be in the same or close alignment. From the vertical line of force passing through the center of mass of the body, with the help of full extension of each of the shoulder, hip, and knee joints, and this is what some studies have confirmed (Intidhar, Huda, Iqbal) "that the vertical line passing through the center of mass of the body, in light of continuous performance, should be perpendicular to the center of the base between the hands." (13), and the two researchers worked on using educational exercises that aimed to increase the momentum of the pushing leg and

pushing with the palms until the muscle tension was achieved in order to overcome gravity and place the legs above the base of support (the line of influence of force), because deviating from this line leads to To loss of balance and then falling, and (Shehata) points out, "As the body's center of gravity in its movement is affected by an external and internal force, when it deviates from the correct path during performance, the body often loses its balance, partially or completely, depending on the amount of deviation" (6).

The reason for the significant differences was the use of educational exercises on a regular basis and according to the sequence of the stages of the movement path and according to the variables specified separately to produce the skill in a harmonious manner and with high flow in performance. This worked to correct errors in a sequential manner to obtain a better result and not distract the attention of the players, as he confirms (Al-Fadhli) "Thinking about several mistakes together distracts attention, so it is preferable to gradually correct mistakes and not correct mistakes all at once because that does not give a good result" (5).

The results in Table (4) showed that there were statistically significant differences in all kinematic variables except for the variable (the angle of inclination of the body when serving from the right), the result of which was not significant, and the two researchers attribute the reason for these significant differences to the educational exercises prepared according to the followed educational curriculum, as The trainer was keen to raise the level of performance and overcome mistakes by emphasizing the repetition of some of the exercises used in the curriculum. Radwan points out, "The physical exercises used in the curriculum are an important means by which physical fitness can be achieved that serves movement performance" (7).

As for the variable (the angle of inclination of the body when serving from the right), we notice that there are no statistically significant differences between the pre-test and the post-test. The two researchers attribute the reason for this to the nature and type of exercises used in the followed approach, which may not be consistent with the possibility of developing all the kinematic variables, because they were not prepared. In accordance with all the mechanical principles and foundations that serve the kinematic variables that determine the kinetic path of the skill, and this is what some studies have confirmed (Shehata) "that studying the kinetic paths of the skill in terms of the set of kinematic characteristics that distinguish it with the aim of calculating the values of the indicators associated with the kinetic path and identifying those characteristics It facilitates the initial recognition of errors in the partial and then the overall path of the skill" (8).

The results in Table (5) showed that there were statistically significant differences in all variables except (forearm angle in the forehand) and in favor of the experimental group at the expense of the control group.

The two researchers attribute the reason for the significant differences to their exercises prepared according to Laban's classification, which were developed to address each indicator separately, meaning that the educational exercises took into account all positions and movements in the body parts, as (Al-Amiri's) study indicates "that the body parts do not move at the same time and at one speed, so the body It contains many joints that work to move the body in different parts and in different shapes and positions, provided that the movement is completely coordinated between the movements of the body parts in order to accomplish the kinetic task that is intended to be achieved" (9), and the two researchers confirm that each of these indicators The indicators were employed to serve the goal of performing the skill, as you believe that controlling these variables in that direction is in the service of achieving good angular speed for the moving parts of the body. Talha points out that the amount of angular movement of some parts of the body has a role and is the first and influential factor in the movement of the body during performance. The movement is that the torso joint occupies the largest mass of the body parts, in addition to the fact that the direction of the angle of inclination of the body in the side direction is better, as it contributes to achieving a greater distance forward, and it leads to an increase in angular velocity, provided that the increase is directed and organized so as not to lead to the player falling, and that increasing flexion In the shoulder joint in a relative way, it can contribute to producing a

large momentum force as a result of extending the shoulder joint and then contribute to the continuation of the movement. Therefore, (Hossam El-Din) confirms, "The angle should not be deeper than what is required to perform the skill because it can be an obstacle and affect the flow." Movement, then emphasizes taking angles that can achieve high fluidity at this stage. Atheer Sabri points out that the angle of the shoulder joint has an important mechanical role in producing good force that serves the goal of movement as a result of high muscle contractions (10).

Conclusions:
Through the results achieved in the current study, the following conclusions were reached:
- The exercises prepared according to Laban's classification showed a positive effect on the kinematic variables under study in the basic skills in squash among junior players in the Iraqi Special Squash Academy at the age of (16) years.

Recommendations:
- The necessity of applying exercises that target kinematic variables and developing them because of their effective role and basis in learning the skill performance of various sports.
- Emphasis on conducting similar studies that employ other classifications that deal with kinetic description, and demonstrating their impact on learning other skills in the sport of squash.

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The beneficiary of the research: Junior players at the Private Squash Academy aged (13-15) years.
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Appendix (1)
Exercises prepared by the two researchers

Exercises prepared by the two researchers:

The exercises were prepared by the two researchers, reviewing studies, research, scientific books, and specialists, experts in the field of racket games, which include targeting the variables under study to achieve the research objectives. The two researchers sought to use all methods and methods during the implementation of the exercises that could achieve the purpose of their study as well. Paying attention to the quality of exercises and choosing the best ones to provide a service to the individuals in the research sample, as the focus is on four joints or dimensions that are considered important in preparing the exercises.

The special exercises revolve around these dimensions to bring about the required change in developing performance by targeting influential variables that include body angles when performing basic skills. The schedule for the special exercises prepared for two months consists of Monday, 25/9/2023, to Wednesday, 22/11/2023. There are three educational units per week (Saturday, Monday, Wednesday) according to the schedule for these ages of players, and the exercises are graduated from easy to difficult. The two researchers develop the content of their own exercises with the desired educational goals. The exercises are also developed according to the special dimensions of the classification and according to their importance every dimension

No.	Exercise content	Educational aim
1	The coach stands in the middle of the front part of the court, holds 2 balls in his hand, and throws a ball to any corner of the court. The player catches it and returns it to the coach, so the coach gives him another ball to another corner.	Body activities (body)
2	Place 4 cones towards each corner of the court and the player moves from the middle of the court behind these cones to perform the front straight hit from each corner and return to the middle of the court for 10 seconds like this.	Paths + direction + levels (space)
3	From the normal standing position, holding the squash racket, throw it upwards, then clap once, and when throwing it upwards more, the clap is twice, and as the distance to the top increases, the number of claps increases, and so on until the number of claps reaches 10 times.	(a) Relationships (b) Body awareness (body)
4	From the ready position, hold the tennis ball and hit it on the ground. When the ball rises to shoulder level, the player extends his hand and catches the ball	(a) Relationships (b) Body actions (body)
5	Player (A) stands with two different colored tennis balls in his hands in front of player (B). When he leaves one of the balls, player (B) picks it up. However, if player (A) leaves the two balls together, then player (B) leaves the balls and does not touch them.	relations
6	From the ready position from the beginning of the squash court, the player performs the step (advance), then the hop with the front foot only and balance, then returns to the ready position and so on until the end of the court. The exercise is repeated with the back leg once.	(a)body activities (body) (B)Directions (space) (a)Flow (effort)
7	From the ready position, jump sideways to the right once and to the left once, each time doing a small hold6	direction
8	The player stands on the service box to execute a back straight shot to and from the service box above the cut line (serve).	direction
9	Drawing a square on the ground and the player standing in the	

	middle of the square. When instructed to start, the player touches the front line with the right leg and the back line with the left leg at the same time, then vice versa. Then he touches the right side line with the right leg and the left line with the left leg.	(B)Direction (space) Extension
10	Drawing a triangle on the ground, the player stands on both ends of the triangle. When instructed, the player jumps by touching the vertex of the triangle with one foot, then returns to the two ends of the triangle, then touches the vertex of the triangle with the other foot, and so on.	(a) Streamline (effort) (b) direction (space) Extension
11	Place three cones spaced apart, and each cone has a specific number or color. The player stands in front of the three cones, and when he hears a specific cone number, the player performs the exercise.	relations
12	The coach stands in the middle of the front part of the court and gives instructions with numbers after each corner has been numbered with a number and moves according to the coach's instruction to the specific corner number to perform a straight forehand shot to return to the middle of the court.	(a) Directions + paths (b) Relationships
13	The player stands on the service box and executes forehand groundstrokes to and from the service box below the cut line	Extension of paths + levels (space)
14	From the right service box, the player performs alternating forehand and backhand shots	space
15	Place a group of cones in the middle of the field and the player moves back and forth between these cones and performs a backhand stroke at each cone.	(a) The body (b) Directions + paths (space) (c) Relationships
16	He performs back side strikes, then moves sideways to the opposite side and executes low, straight forward strikes, and so on.	(a) The body (b) Directions + paths (space) (c) Relationships
17	The player stands in position (T), moves according to the coach's instructions to the cones, and returns to position (T)	(a) The body (b) Directions + paths (space) (c) Relationships
18	The player stands in position (T), moves according to the sequence of numbers, and returns to position (T).)	(a) The body (b) Directions + paths (space) (c) Relationships
19	The player stands in position (T) and, upon the coach's signal, moves in three steps to the right corner (left - right - left) and performs an imaginary hit with the racket without the ball.	(a) The body (b) Directions + paths (space) (c) Relationships
20	The player stands in position (T) and, upon the coach's signal, moves in three steps to the left corner (right - left - right) and performs an imaginary hit with the racket.	(a) The body (b) Directions + paths (space) (c) Relationships
21	The player stands in position (T) and moves and transfers the balls from the left court to basket (1), from the right court to basket (2), and so on.	(a) The body (b) Directions + paths (space) (c) Relationships
22	The player stands in position (T), moves and transfers one of the (3) balls to each racket and then returns it to the same racket and so on.	(a) The body (b) Directions + paths (space) (c) Relationships
23	The player performs a low forehand shot from the back court below the service line	(a) The body (b) Directions + paths (space) (c) Relationships
24	Floor background and then alternating low straight floor	(a) Relationships (b) The body (c) Extensions (space)
25	The player stands in the middle of the field and moves three steps towards the right back corner (pulling the feet together) in three steps.	(a) Relationships (B) The body
26	From the standby position, each player is given an air balloon, and upon hearing the instruction, the player blows the balloon upward in front, and when the balloon descends and reaches the level of the player's shoulder.	(a) Extensions + paths (Void) (b) Relationships

27	At the instruction of the coach, the player makes a complete circle around the funnel placed in the T area and heads towards the specified angle to execute the forehand shot.	(a) The body + (b) Relationships (c) Extensions (effort)
28	Running on tapes placed in a zigzag manner that determines the running path while tapping an educational tennis ball with both hands (rolling the ball with the right hand, receiving it with the left, and so on) for a distance of 5 m.	Extensions + direction + paths (space) relationships
29	A executes a long forehand (straight) B executes a short (drop) forehand A executes a high forehand shot B executes a long forehand groundstroke A executes a short (drop) forehand and so on	paths (space) relations
30	A executes a long forehand B executes a long forehand A executes a forehand volley B executes a long backhand volley A executes a long backhand volley B executes a backhand volley and so on	Time (effort) body movement(body) The relational space
31	The player stands in the middle of the court and moves three steps towards the right front corner (left - right - left) and then performs a forehand shot.	Extensions)space(

أثر تمرينات على وفق تصنيف لابان لتطوير بعض المتغيرات الكينماتيكية في بعض مهارات الاسكواش لدى اللاعبين الناشئين في الاكاديمية الخاصة للاسكواش باعمار (13– 15)

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المستخلص

هدف البحث الى إعداد تمرينات خاصة وفق تصنيف لابان لتطوير بعض المتغيرات للعبة السكواش للناشئين والتعرف على تأثير التمرينات الخاصة المعدة على وفق تصنيف لابان لتطوير بعض المتغيرات الكينماتيكية للعبة الاسكواش للناشئين. واستخدمت الباحثتان المنهج التجريبي ذي المجموعتين المتكافئتين التجريبية والضابطة لملاءمته وطبيعة المشكلة المراد حلها. اختير مجتمع البحث بالطريقة العمدية والمتمثل باللاعبين الناشئين في الاكاديمية الخاصة للاسكواش التابعة للاتحاد العراقي المركزي للاسكواش، والبالغ عددهم (16) لاعب للموسم الرياضي (2023-2024م)، وهم يمثلون عينة البحث، وتم تقسيمهم بالطريقة العشوائية وبأسلوب القرعة الى مجموعتين متكافئتين تجريبية وضابطة بمعدل (8) لاعبين لكل مجموعة وبهذا تمثل العينة 100% من المجتمع الاصل وهي نسبة ممثلة للمجتمع تمثيلاً صادقاً. ومن اهم النتائج التي توصلت اليها الباحثتان هي ان: التمرينات المعدة وفق تصنيف لابان تأثير إيجابي على المتغيرات الكينماتيكية قيد الدراسة لدى بمهارات الأساسية في رياضة الاسكواش لدى لاعبي الناشئين في الاكاديمية   الخاصة للاسكواش العراقي بعمر (15-13) سنة، ومن اهم اهداف التنمية المستدامة التي يدعمها البحث هي الصحة الجيدة والرفاه. وهذا ما يحقق احد اهداف التنمية المستدامة للامم المتحدة في العراق (التعليم الجيد)

الكلمات المفتاحية	تصنيف لابان ، المتغيرات الكينماتيكية، للاعبي الإسكواش