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The Relationship of Neuromuscular Compatibility to some Basic Skills in Badminton

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Abstract

The progress and development in the achievement of advanced players in the badminton event did not come through short-term preparation periods, but rather in continuous planning for long preparation periods and the presence of a wide base of young, junior and then youth players, and the process of paying attention to the emerging players and focusing on their physical preparation And the skill, tactical, and psychological aspects. Badminton players must also possess the basic physical elements that enable them to perform the motor skills of this game. The motor coordination element is one of the important elements that badminton players need in performing movements that require complete coordination and harmony between the work. The nervous system is able to deliver nervous signals at the appropriate moment and accuracy, and between the work of the device are the important elements that badminton players need in performing movements that require complete coordination and harmony. Between the work of the nervous system to deliver nervous signals at the appropriate moment and accuracy and the work of the device

The problem of the research emerged in knowing the relationship between neuromuscular coordination and basic skills in badminton, in order to determine the obstacles and negative aspects that guide this study, both scientific and field, and to try to address them so that coaches and players can benefit from the goal of the research. To identify the relationship between specific neuromuscular compatibility with basic skills in badminton, the sample included 30 training center players aged 16 years. The researcher used some badminton skill tests in addition to neuromuscular compatibility tests .

1. There is a significant correlation between specific neuromuscular coordination (eye and hand) and the skill of the forehand and backhand stroke in badminton.

Keywords: neuromuscular coordination, basic skills, badminton

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1.Research definition

1.1 Introduction to the research and its importance:

Badminton is one of the sporting events that has attracted wide attention from many people, as it has become one of the important games at the international level and in all major international forums.

It must be noted that the positive development of this game has reached great progress In recent years, this is what we notice in the methods, methods, and defensive and offensive game plans that are subject to change or modification from one period of time to another and according to the playing conditions in the match.

This progress and development in the achievement of advanced players did not come in short-term preparation periods, but rather in continuous planning for long preparation periods and the presence of a wide base of young and junior players, then Muscular work is affected by the length of the muscle, gender, body type, the amount of training, the size of the muscle, as well as the ability of the nervous system to issue commands, the effectiveness of the muscle, the nature of its composition, the amount of chemical reaction that occurs within it, which is based on the nerve impulses emanating from the brain, as well as the strength of these impulses.

Badminton players must also possess the basic physical elements that enable them to perform the motor skills of this game, and the motor coordination element is one of the important elements that badminton players need in performing movements that require complete coordination and harmony between the work of the nervous system to deliver nervous signals at the moment. And appropriate accuracy and between the work of the muscular system .The implementer of these instructions, and this process requires complete harmony between the nervous and muscular systems. Harmony here in the work of the two neuromuscular systems is one of the basics that cannot be dispensed with in executing the motor skills of this activity in a proficient manner.

1.2 Research problem:

Trainers, researchers and experts interested in the effectiveness of badminton have made great strides towards developing the level of this game by relying on the results of scientific studies and field research in various fields of physical

education, in order to achieve an improvement in the physical, skill, tactical and psychological aspects of badminton players in particular.

One of the physical aspects that has received striking attention from coaches and players is the quality of neuromuscular coordination, as this feature is extremely important in executing the various skills related to this event in a highly technical manner, especially the complex ones, which in their performance require the use of more than one part of the body at a time. Moreover, it requires the integration of movements of multiple types into a framework One, as we often notice players who are characterized by good physical and physical ability, but they are unable to perform some skills or movements that require a certain amount of compatibility, because the quality of neuromuscular compatibility is linked to all the performance performed by the players, especially in different playing conditions characterized by strong competition and close levels of performance. During matches, especially official ones Through the researcher's review of many scientific and field researches and studies, he found that there were few studies that investigated the characteristic of neuromuscular compatibility in badminton. For this reason, The researcher found that it was his duty to conduct this study to find out what the relationship is between special compatibility and the basic skills in badminton, and from here. The research problem has emerged in knowing the relationship between nervous compatibility Muscular skills and basic skills in badminton. The purpose of this study is to identify the scientific and field obstacles and negative aspects that guide this study and to try to address them so that coaches and players can benefit from them to develop and serve this large public event in a way that is consistent with and achieving the goals of sports training in an interesting scientific manner.

1.3 Aim of the research:

Identifying the relationship between special neuromuscular coordination and some basic skills in badminton

1.4 Hypothesis of the research:

There is a significant relationship between specific neuromuscular compatibility and some basic skills in badminton

1.5 Research areas:

1. Human field: Junior players from the Badminton Training Center in Babylon under the age of (16) years.

2. Time range: for the period from 7/28/2024 to 9/30/2024.

3. Spatial field: The training center stadium at Al-Mahawil Club

1.6 Definition of terms:

1.6.1 Neuromuscular compatibility:

(Abdel Fattah, 1997) defined it as "the athlete's ability to speed up motor performance with accuracy of performance in achieving the goal with economy of effort" (Abdel Fattah,1997,205).

Clayne defined it as "the performance of different muscles that work together in harmony and with precise and proper timing through their muscle contractions" (Clayne, 1986, 70).

The researcher can define it operationally:

It is the ability of the neuromuscular system to work in great harmony and harmony to perform a number of movements in a smooth manner with good performance ability.

Special neuromuscular coordination (eye and hand)

Most motor skills require a degree of coordination between the eye and the hand, and in the effectiveness of badminton, the need for this characteristic is particularly evident during the performance of most skills, as the player who will play badminton must achieve coordination and harmony between the work of the sense of sight that monitors the fellow player or the strike.

Forehand, and that any deficiency or defect in the quality of coordination between the work of the eye and the hand will inevitably lead to the execution of the skill poorly and then the loss of the shuttlecock. Al-Khouli and Ratib point out that "weakness in the coordination between these parts is one of the important issues that may be the result of weak motor sensation." Or the slow degree of connection between the nervous and muscular systems"(Al-Kholy andRatib,1983,217).

2.1.2 Neuromuscular compatibility:

The importance of the coordination component in badminton becomes apparent when the player performs movements that require the use of more than one of the body's organs. The coordination component requires complete

harmony and cooperation between the nervous and muscular systems to best execute motor skills in badminton, especially complex ones.

The quality of coordination depends on the integrity of the nervous and muscular systems and their connection. Together in one work in performance Skilled motor skills in badminton. Larson and Yochem point out that "the individual's ability to integrate more than one movement within one framework requires a special efficiency of the nervous system," and "nerve signals must be sent to more than one part of the body at the same time, and the performance of the movement may require that it be a movement." These parts of the body are in different directions at the same moment in time in order to produce movement in the appropriate image.

2. Search Procedures:

2.1 Research Methodology:

The researcher used the descriptive survey method for its suitability and the nature of the research.

2.2 Research sample:

The research sample was chosen intentionally, and they represent the junior badminton team of the Training Center under the age of (16) years for the football season (2023-2024). The sample consisted of (30) players, and Table (1) shows the ages, masses, and heights of the research sample.

Table (1): shows the arithmetic means, standard deviations, weights, and lengths of the research samples

Statistical features variables	Standard deviation	Arithmetic mean
Age (year)	0.76	15.03
Weight (kgm)	3.95	51.56
Length (cm)	4.65	160.90

2.3 Devices and tools used in the research:

(Stopwatch, badminton rackets, plastic feathers, signs, badminton court)

2.4 Methods of data collection:

♣ Determine the measurements and tests used:

♣ Physical measurements included: (height measurement, weight measurement).

♣ Compatibility tests:

The researcher distributed a questionnaire to those with experience and knowledge in the field of measurement and evaluation to determine the tests for neuromuscular coordination that obtained an agreement rate of more than (75%). It included two tests: (the eye-leg coordination test, the eye-hand coordination test).

♣ Basic skills in badminton:

The researcher conducted a content analysis of some scientific sources and identified some basic skills in badminton:

- Transmission skill

- Forehand skill

- Backhand skill

Skill tests in badminton:

The researcher prepared a questionnaire that included tests on the basic skills in badminton. The questionnaire was distributed to those with experience and knowledge in the field of badminton, and the selected tests obtained an agreement rate of more than (75%), which included:

1. Short transmission test

The purpose of the test: to measure the accuracy of performing the short serve skill

Tools: Badminton rackets, legal court, plastic blades, rubber rope

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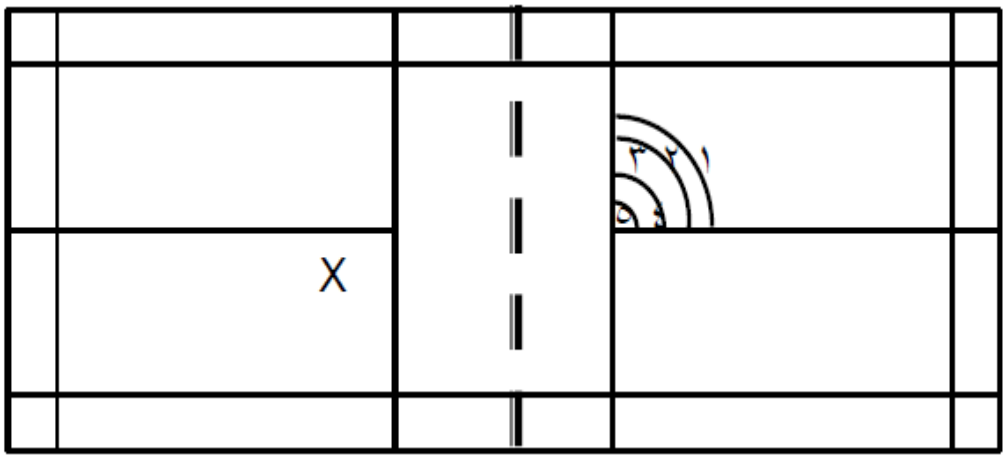

Figure (1) shows the pitch layout for the short serve test

Performance evaluation:

A . After explaining the test to the players, the player stands in the (x) area.

B . The player sends 12 serves so that the shuttlecock passes between the net and the rubber rope that is 51 cm above the net, in order to drop the shuttlecock in the numbered areas, and his best 10 attempts are counted.

2.Forehand and backhand test

A . Front dimensions stroke

- Purpose of the test: to measure the accuracy of the front dimensional strike performance

- Tools: badminton rackets, plastic feathers, rope, additional posts with a height of 244 cm, a registration form, a court planned according to Figure (2)

- Performance evaluation:

- After explaining the test to the players, the player stands in the (x) area.

- At the moment the coach sends him the shuttlecock, the player can move if this is necessary for the success of the attempt, and he must hit the shuttlecock with a forehand strike from above the head to send it over the net towards the area designated by the steps.

- The player is given 12 attempts and the best 10 attempts are recorded.

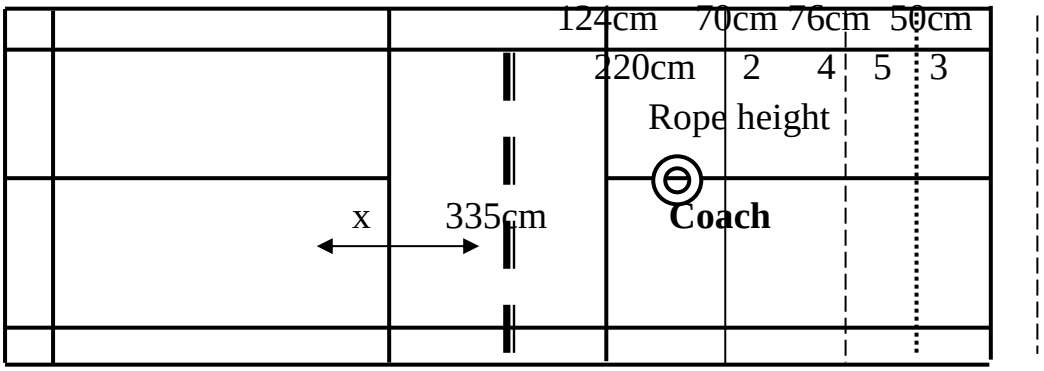

Figure (2) shows the pitch layout for the forehand strike

B. Rear dimensions stroke

- Purpose of the test: to measure the accuracy of the backhand stroke performance

- Tools: badminton rackets, plastic feathers, rope, additional posts with a height of 244 cm, a registration form, a court planned according to Figure (3)

- Performance evaluation:

- After explaining the test to the players, the player stands in the (x) area.

The coach serves so that the shuttlecock reaches the player's left side so that he can perform the backhand stroke

- At the moment the coach sends him the shuttlecock, the player can move if this is necessary for the success of the attempt, and he must hit the shuttlecock with a backhand strike from above the head to send it over the net towards the area designated by the steps.

The player is given 12 attempts, and the best 10 attempts are recorded. The maximum score is 40 points.

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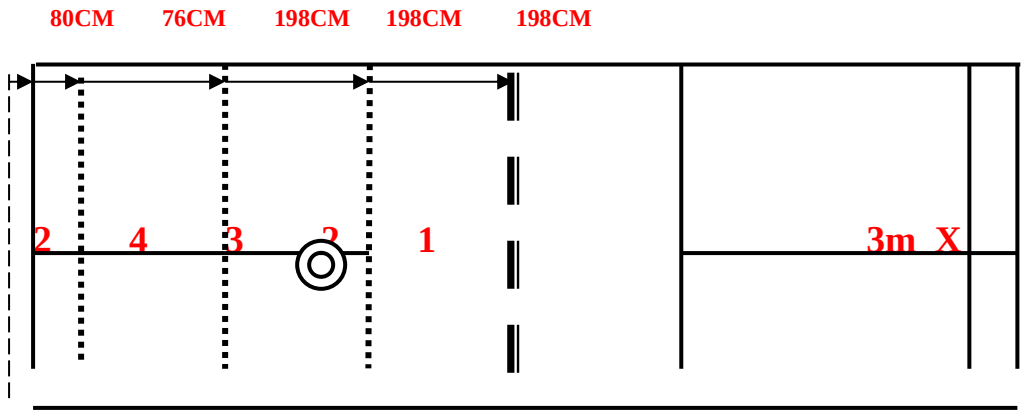


Figure (3) Schematic of the court for performing the backhand shot

3.6 Applying research tests:

The researcher applied badminton skill tests to the research sample on 7/28-29/2023, as well as implemented two compatibility tests (Ain and Hand) on 7/30/2023.

3.6 Statistical methods used in the research:

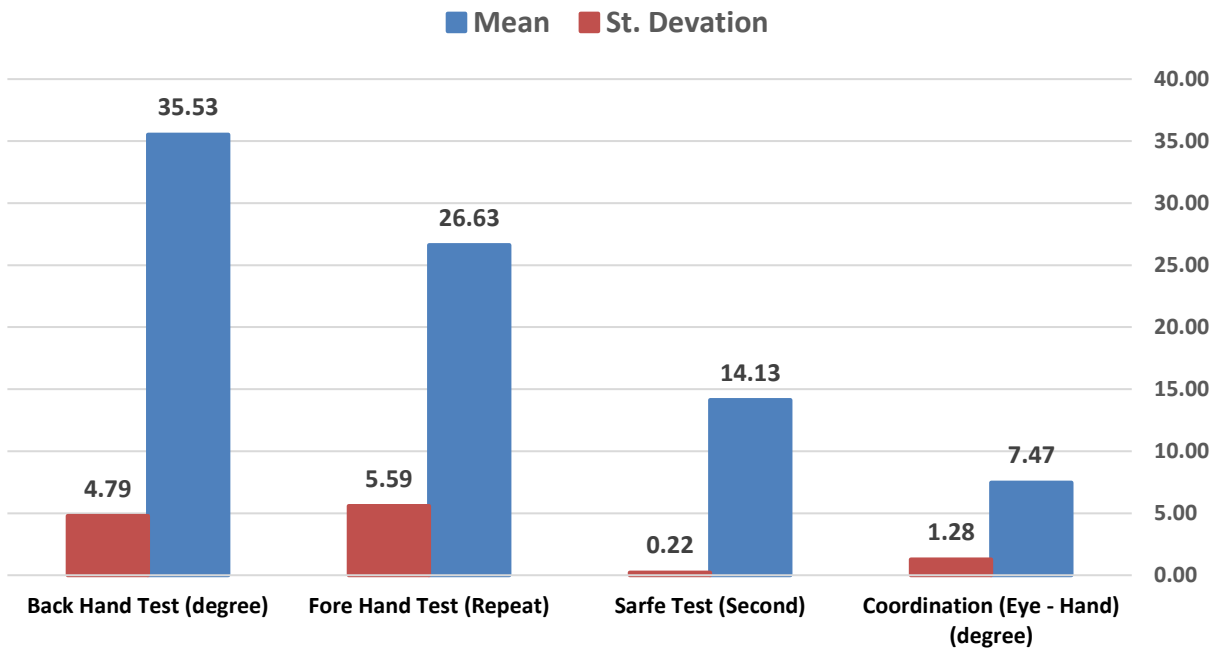
(arithmetic mean, standard deviation).

(Simple correlation coefficient (Pearson)) (Dawoud and Elias, 1990, 28-53).

- Presentation and discussion of the results:

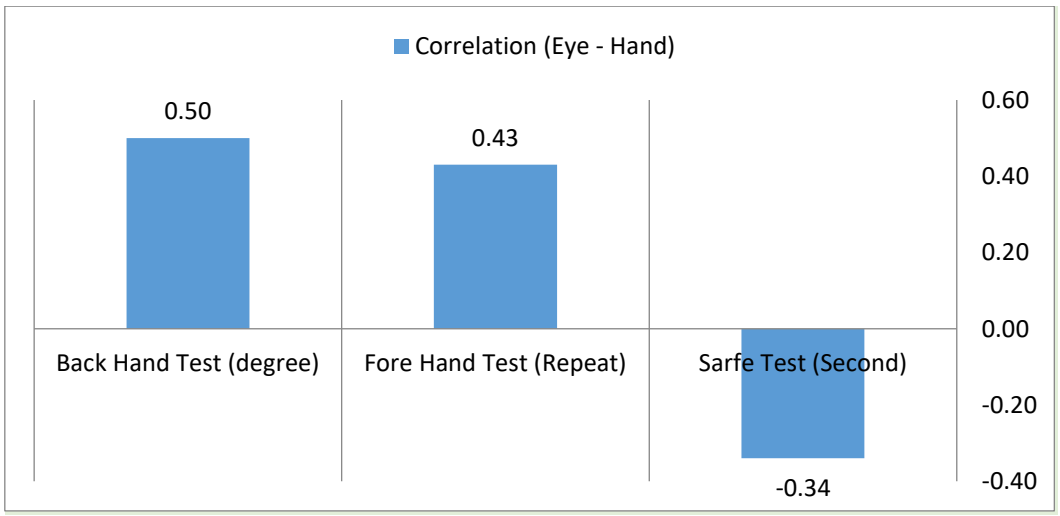
In light of the statistical data obtained by the researcher, the results will be presented and discussed. Table (2)

It shows the arithmetic means and standard deviations of the results of the special compatibility tests (eye and hand) and the skill tests in badminton.



1. Presentation, analysis and discussion of the results of the special neuromuscular coordination test (eye and hand) and its relationship to basic skills in badminton. Table (3)

It shows the values of the correlation coefficient between the special neuromuscular coordination test (eye and hand) and the basic skills in badminton, and the tabular value of the correlation coefficient



The tabulated value of (R) was (0.30) at a degree of freedom (30 -2 = 28) and a significance level (0.05).

3.2 Presentation, analysis and discussion of the results of the special neuromuscular coordination test (eye and hand) and its relationship to the skill of serving in badminton:

Table (3) shows that the calculated (R) value for the transmission skill was (0.34), which is greater than the tabulated (R) value (0.30). This indicates the existence of a significant correlation between the special compatibility test and the skill of humping, and the researcher attributes this result to the existence of a direct relationship. Between performing the sense of sight and the arms, during the tapping, the performing player must monitor his teammate and the opponent with his eyes, and then match the sight and action.

The hand that will perform the skill, and this requires a certain amount of speed with which the shuttlecock will be played, in addition to having the quality of accuracy to deliver the shuttlecock to the opponent's court without cutting it, as well as the reaction of the player who will play the shuttlecock. Al-Takriti and Muhammad Ali indicate that "there is a positive relationship between compatibility and speed of reaction." . (Al-Tikriti and Muhammad Ali, 1986, 127).

This indicates the presence of the quality of compatibility through the player's good coordination ability between his performance of the skill, his sense of the external environment, his anticipation of different playing situations, his ability to balance and determine the movement of his teammate inside the field using the sense of sight and the muscles involved in motor performance, and this is consistent with what (Al-Wattar) confirmed that "it is possible Note the importance of neuromuscular coordination by observing the player's ability On balance, stability, and organizing motor actions within the arena, and by determining the appropriate place for the player's movement within the arena" (Al-Wattar, 1997, 114).

3.3 Presentation, analysis and discussion of the results of the special neuromuscular coordination test (eye and hand) and its relationship to the forehand skill in badminton:

It is clear from Table (3) that the value of (R) calculated for the forehand skill is from the shoulder level

It reached (0.43), which is greater than the tabulated (R) value of (0.30). This indicates the existence of a significant correlation between the compatibility

test and the skill of the forehand from the shoulder level. The researcher believes that this result is due to the specificity of the skill of the forehand from the shoulder level, which requires... Accurate timing, high accuracy, and correct prediction of skill, as this requires complete coordination between the work of the arms and eyes. And the legs and eyes accurately and quickly by estimating the distance of the forehand with the sense of sight, then performing the process of jumping strongly with the legs and with the help of the arms to reach the state of the good forehand of the ball. The player who has good skill in the forehand from shoulder level must have high compatibility in the work of the nervous and muscular systems. Through the smooth rhythm of pulse transmission.

The nerve fiber from the nerve fiber with high timing to the muscle fiber that carries out the movement to perform the skill perfectly. Khalifa confirms this by saying, "The coordination between the eye, hand, and foot is the most important factor for athletic performance, as during performance there is a transmission of nerve signals between the nervous and muscular systems, and therefore all The movements that an individual makes, whether they are normal movements or related movements In the field of sports performance, it requires a degree of compatibility between the two aforementioned systems" (Khalifa, 1984, 183). The researcher believes that this skill has a peculiarity that lies in the participation of most parts of the body in performing it, and this requires the availability of a high degree of special neuromuscular compatibility, which is one of the conditions for performing this skill.

3.4. Presenting, analyzing and discussing the results of the special neuromuscular coordination test (eye and hand) and its relationship to the badminton backhand skill.

It is clear from Table (3) that all of the calculated (R) values for the previously mentioned skills are greater than the tabulated (R) value, and this indicates that there is a significant correlation between the special compatibility test (eye and hand) and the previous skills. The researcher attributes this result to the presence of a moral correlation for these skills. Because of its connection to compatibility . Special (eye and hand) because most badminton skills depend on using the sense of sight with the hands to perform the motor performance more than on using the legs, and this results from the specificity of the basic skills that characterize the effectiveness of badminton because it is mainly linked to the movements of the hands in playing badminton and in Different playing situations.

4. Conclusions and recommendations:

4.1 Conclusions:

1. There is a significant correlation between specific neuromuscular coordination (eye and hand) and skill (serving) in badminton.

2. There is a correlation between special neuromuscular coordination (eye and hand) and the skill of the forehand and backhand strokes of badminton.

4.2 Recommendations:

1. Increasing attention to the quality of neuromuscular coordination (eye and hand) in performing exercises and finding ways to link it with the basic skills in badminton, especially with the skills (serve and forehand and backhand).

2. Emphasis on good training in badminton skills because it improves nervous coordination

Muscle for players.

3. Benefit from the results of this study and try to apply its results in the field.

4. Conducting studies on neuromuscular compatibility in other sporting events.

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Appendix (1)

A questionnaire of the opinions of experts on determining neuromuscular compatibility tests

The honorable professor. . . . . Respected:

The researcher intends to conduct the research entitled "The relationship between neuromuscular compatibility and some basic skills in badminton." Given your experience and knowledge in the field of measurement and evaluation, please specify the most important tests for neuromuscular compatibility.

With many thanks and appreciation. . .

Note: Answer by √

	Test	**The purpose of the test**	**Measurement unit**	**Choice**
1	knock on the flat surfaces	Measure hand, device and eye compatibility	Repetition	
2	Geometric shapes	Measure hand, device and eye compatibility	Second	
3	Jumping rope	Measuring compatibility	Repetition	
4	Running in shape (8)	Measure the ability to change body position	Second	
5	Crawling in shape (8)	Measuring the body's movement ability while crawling	Second	

6	rods	Measuring eye-hand coordination	Degree	
7	Hand movement matching	Measuring eye-hand coordination	Second	
8	Pendulum	Measuring eye-hand coordination	Degree	
9	Throwing and receiving balls	Measuring eye-hand coordination	Degree	
10	Numbered circles	Measuring eye-to-eye compatibility	Second	

Academic degree:

Specialization:

Signature: researcher

In the name of God, the most gracious, the most merciful

Appendix (2)

Vocabulary specifications for the special neuromuscular coordination tests (eye and leg) and (eye and hand)

ϖ Testing numbered circuits:

ϖ Objective of the test: measuring compatibility (eye and foot).

ϖ Tools used: stop watch.

ϖ Performance specifications: Eight circles are drawn on the ground, each with a diameter of (60 cm).

ϖ Test method: The tester stands inside circle No. (1) and when he hears the start signal, he jumps

With both feet together to circle No. (2) and from there to circle No. (3) until circle No. (8) and the performance is performed at maximum speed.

Recording method: The laboratory records the time it takes to move through the eight circles.

ϖ Ball throwing and receiving test:

ϖ Test objective: measuring eye-hand coordination.

ϖ Tools used: a tennis ball, a wall, a line drawn at a distance of (5 m) from the wall.

ϖ Performance specifications: The tester stands in front of the wall and behind the line drawn on the floor

ϖ Performance method: The experimenter throws the shuttlecock (5) consecutive times with the right hand, receiving the shuttlecock after it bounces from the wall with the same hand. Then he throws the shuttlecock (5) consecutive times with the left hand, receiving the shuttlecock after it bounces from the wall with the same hand. Then the experimenter throws the shuttlecock (5) consecutive times with the left hand. By throwing the shuttlecock (5) consecutive times with the right hand, receiving the shuttlecock after it bounces

From the wall with the same hand, then he throws the shuttlecock (5) consecutive times with the left hand, receiving the shuttlecock after it bounces from the wall with the same hand. (Hassanin, 1995, 425-426).