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Effect of Special Exercises According to the Mental Visualization Multi-Dimensional Using Auxiliary Means to Developing Some Basic Tennis Skills for Players

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Abstract

The importance of the research lies in preparing special exercises according to the mental visualization multi-dimensional using aids to develop some basic tennis skills for players, as well as identifying the effect of those exercises in developing some basic tennis skills for players.

As for the research problem. The researchers noticed a weakness in some of the basic skills of the players, so the motor program is incomplete correctly, in addition to the fact that the speed of the ball and the area of the playing field require that the player have a high ability to perform. Therefore, the researchers decided to use multi-dimensional mental visualization exercises (audio-visual-kinetic) through the basic concept of it and preparing special exercises for the variables of mental multidimensional perception so that the player, after storing this information, can benefit from the mental aspects and mental aspects, in addition to providing and using a set of devices and auxiliary tools that will facilitate and reduce the effort required in the learning process.

The study aimed to prepare special exercises according to the mental multi-dimensional visualization using aids in developing some basic tennis skills for players. As well as identifying the effect of special exercises according to the mental multi-dimensional visualization using aids in developing some basic tennis skills for players. The researcher hypothesized that there is a positive effect of special exercises according to the multi-dimensional mental perception using aids in developing some basic tennis skills for players between the pre and post- tests.

The researcher used the experimental method in the style of equivalent groups (experimental group and control group) and the research sample was represented by the players of the Durat Kerbala Tennis Center with ages (11-13), who numbered (16) players and after conducting the main experiment the researcher used the statistical bag (spss) to extract the results and their statistical equation. The researcher reached the following conclusions that the special exercises according to the mental multi-dimensional visualization, using aids that greatly helped in learning some basic skills in tennis (forehand, backhand, serving). The special exercises according to the mental multi-dimensional visualization using aids effectively contributed to the development of performance of the skills under study

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Introduction:

Motor learning is one of the important sciences in the sports field and is directly related to what the learner acquires from learning mathematical skills, because it is a set of mental processes that occur during the exercise that help the learner to change his motor behavior and increase his abilities for skillful learning.

As most of the modern theories in motor learning recommend learning all performance possibilities and in conditions similar to the circumstance of competition in order for the player to get used to them, which helps him to reduce his skill performance errors, especially in games and skills of an open nature.

Recent years have witnessed a remarkable interest in studies related to the study of mental processes because of their essential role in the learning process, information is transformed from one form to another, the information is translated on the motor path, and the final skill that the learner acquires through these processes that pass through several stages in the required activity, whether cognitive or kinetic.

Hence, those in charge of the educational process tended to find various aids aimed at developing the educational process in proportion to the ages of the players and their motor abilities, and to be developed in a scientific, planned and appropriate manner for the skill to be taught. Most of the specialists have been interested in manufacturing many aids that facilitate the learning process and are used in learning skills to reduce time and effort on the stadiums and the coach, it plays a key role in building educational units, as the learner or player in most cases interacts with them positively, in the end, it gives the result of the correct application of the skills to be learned, in addition to giving the performance a side of suspense, fun, excitement and better learning.

Tennis is one of the games that depends largely on its basic skills, which are considered open-ended skills. Therefore, any progress in the player's level and success depends largely on his mastery of those skills, where it is not possible to reach the perfect skill performance and draw an ideal motor path for the skill unless work is done according to appropriate exercises and aids for those skills, it is not possible to stand on these exercises and aids unless they are tried and the best ones are selected based on the final results that are reached in order to reach the players higher and better levels in the skillful performance of this game

Hence the importance of the research in preparing special exercises according to the mental multi-dimensional visualization using aids in some basic tennis skills for players.

Research problem:

Through the researchers' review of a number of educational references for coaches and their follow-up to most of the players at young ages, they noticed that there is a weakness in some of the basic skills of the players, knowing that these players are at very young ages, so the motor program is not completed correctly, in addition to the speed of the ball and the area of the playing field. The player has a high ability to pay attention, therefore, the researchers decided to use multi-dimensional mental visualization exercises (audio-visual-kinesthetic) through the basic concept of it, and to prepare special exercises for the variables of multi-dimensional mental

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visualization so that the player, after storing this information, can benefit from the mental aspects and mental aspects in addition to providing and using a set of devices and the auxiliary tools that would facilitate and reduce the effort required in the learning process.

Research objectives:

- Preparing special exercises according to the multi-dimensional mental perception using aids in developing some basic tennis skills for players.
- Identify to the effect of special exercises according to the mental multi-dimensional visualization using aids in developing some basic tennis skills for players
- Identify to the advantage of influencing special exercises according to the mental multi-dimensional visualization using aids and regular exercises in developing some basic tennis skills for players.

Research hypothesis:

- There is a positive effect of special exercises according to the mental multi-dimensional visualization using aids in developing some basic tennis skills for players between the pre and post-tests.
- Special exercises according to the mental multi-dimensional visualization using the aids have the advantage of influencing the development of some basic tennis skills for the players in the post-tests.

Research fields: Dorrat Kerbala Tennis Academy players aged 11-13 years.
The human field:.
Time field: from 3-1-2021 to 19-2-2021.
Spatial field: Dorrat Kerbala Tennis Academy Stadium in Kerbala Governorate.

Research methodology and field procedures:
Research Methodology:

The researchers used the experimental method in the manner of equivalent groups (experimental group and control group) with a pre and post measurement, which is what he deems consistent with the specifications of their research and the achievement of the objectives of their study.

Community and sample research:

The research community identified the players of the Dora Kerbala Tennis Center at ages (11-13), and their number was (16) players, and then the research sample was chosen randomly, where (12 players) were chosen to represent (6) players of an experimental group, (6) players of a control group and (4) players for an exploratory experiment.

Sample homogeneity:

Table (1) shows the statistical treatments of the measurement results and the primary data to find out the state of homogeneity in the variables (age, height and weight) of the research sample.

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Table (1) it shows the arithmetic means, standard deviations and the skew coefficient for the purpose of homogeneity of the research sample in the variables (age, weight, height).

Variables	Measuring unit	Freedom degrees between groups	Freedom degrees within groups	Levin value for mean	Sig level	Sig type
Length	Cm	1	10	1.473	0.253	Non sig
Mass	Kg	1	10	0.455	0.515	Non sig
Training age	Month	1	10	0.360	0.562	Non sig

Devices, tools and methods used in the research:

Means of data collection

- Arab and foreign references and sources.
- A questionnaire form to survey the opinions of experts and specialists.
- Information collection form.
- Note.
- Personal interviews Appendix (1) shows this.

Tools and devices used:

- laptop type (Dell) 2.
- Electronic stopwatches type (Casio) number (2).
- Sony video camera, number 1
- A Chinese-made metric tape with a length of 10 m.
- Tennis balls (200) babolat type.
- Number of pens (24).
- A legal tennis court No. 1.
- Half tennis court with wall number 1.
- Auxiliary tools used in the research (wire ball, virtual reality glasses, spring ball) number 4.
- Tennis rackets, number 24, of the Wilson type.
- Display screen number 1 type LG.
- 24 colored figures.
- Number 12 birthday cones.

Field Research Procedures:

Determining the studied skills:

The researchers studied some of the basic skills that the research problem revolved around, namely (the skill of serving, the skill of the front ground kick, the skill of the back ground kick) as they are among the most commonly used and traded skills during the match.

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Description of the skill tests:

First :The forehand and backhand groundstroke test in tennis : [1]

This test is conducted on a regular tennis court with the preparation of rackets, (200) tennis balls, a registration form, and a fixed rope as shown in figure (1), explaining the laboratory parking areas and how to conduct the test

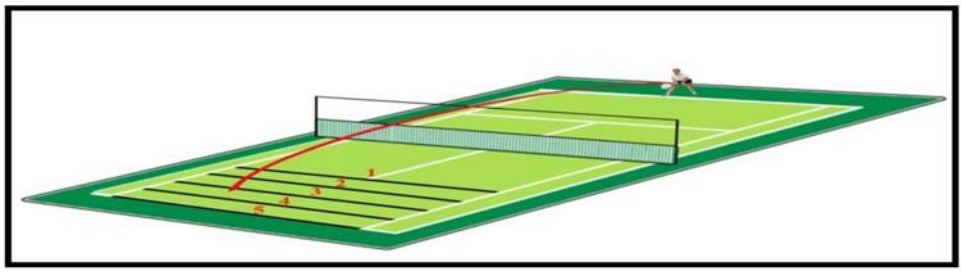


Figure (1)

Testing the accuracy of the forehand and backhand kicks in tennis

- A rope is fixed on two poles in the poles of the net, adjacent to and parallel to the poles, at a height of 7 feet from the ground and 4 feet from the net as shown in Figure (1).
- Three parallel lines are drawn between the transmitter line and the base line, so that the distance between the lines is (4.5) feet.
- The player stands on the center mark that is located in the middle of the base line and is given five trial attempts to know the performance of the test after providing instructions by the coach, provided that the ball is thrown directly behind the service line by the ball thrower, if available, or by the competent coach, and the player begins to try to return the ball with his racket using the hit Forehand or backhand, each player is assigned ten attempts for the forehand and ten attempts for the backhand.
- The player's score is the sum of the points he gets by summing up his ten attempts. The ball must cross the net and down the rope. The player gets ascending grades (1-5) scores. If the ball passes over the rope, it gives half of the calendar mark for the correct area on which it falls and the highest score gets on it the laboratory is (50) degrees for the forehand and (50) degrees for the backhand.

Second: Tennis service skill test: [2]

Purpose of the test: serves skill test

Tools used: tennis court, basket of balls, 200 balls, 12 tennis rackets, tape measure, adhesive tape, and recording paper.

Performance :The player stands behind the base line and performs the serve. The player is given 6 warm-up balls. The player performs the test by performing (12 serves), (3 serve) for each designated square as shown in Figure (2).

Registration: In the first service, two points are awarded for each ball entering the service area and four points if the first rebound is in the intended area of the four service areas located in the service box (the target area). In the second service, one point is calculated for each ball that enters the service area, and two points if the first bounce is in the intended area of the four

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service areas located in the service box (the target area). An additional point is calculated if the first bounce is in the service box and the second bounce is in the one extra point area. The points are doubled if the first bounce is in the service box and the second bounce is in the strength area to double the points. A fixed point is made for each service that is in the service box, and this is for the first and second services, and the maximum total points for this test is 108 points.

Notes: In the case of the ball touching the lines, it is considered inside the field, and in the case of the lines touching between the areas divided between the areas, as shown in figure (2).

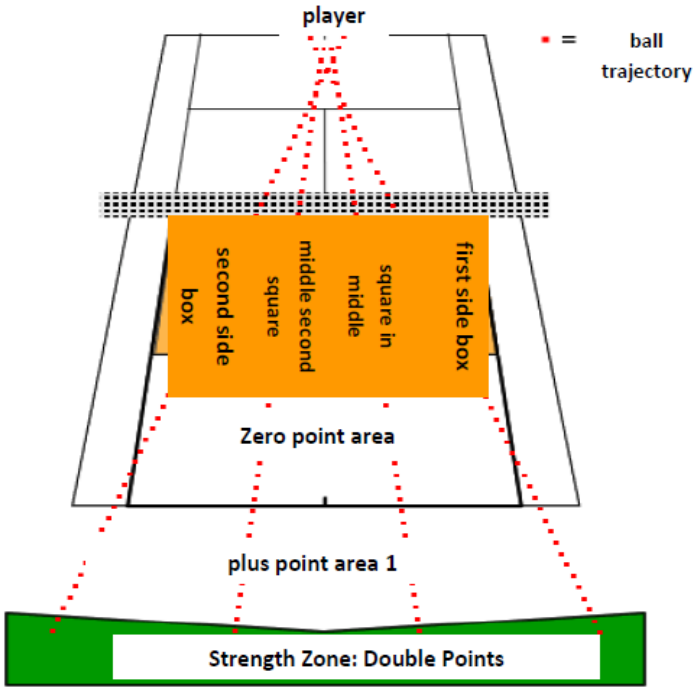


Figure (2)
Demonstrates serves accuracy test

Exploratory experience:

The exploratory experiment is one of the most important necessary actions that the researcher undertakes before performing his final experiment in order to test the research methods and tools and to indicate the requirements for accurate and correct work free of difficulties, the researcher conducted an exploratory experiment on (Sunday) corresponding to 3/1/2021 on a sample of (4) players who were not the research sample, and the objective of the experiment was as follows:

1. Ensure the efficiency of devices and tools.
2. Recognize the time each test takes as well as the time of the total tests
3. Efficiency of the assistant work team.
4. The level of difficulty of the tests for the research sample
5. Knowing the difficulties that the researcher faces in order to avoid them in the future
6. Finding the scientific coefficients of the tests (honesty, reliability and objectivity).

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Scientific bases for basic skills tests:

Validity of the test:

Validity is “the accuracy with which the test measures the purpose for which this test was developed” [3] . Its concept refers to “the quality of the test as a tool for measuring what it was originally designed to measure” [4] . Validity is one of the important characteristics that a good test must have. A test that does not have a good percentage of honesty cannot perform its function, and for the purpose of extracting the validity of the candidate tests for basic skills, thus, the researcher obtained the validity of the content, which is often done “by logical judgment on the existence of the relevant feature, characteristic or ability to investigate whether the proposed measurement method actually measures it or not” [5] .

Reliability:

In order to extract the reliability coefficient for the basic skills tests, the principle of the fixed test must be applied, "which gives close results or the same results if applied more than once in similar conditions"[6] . The test reliability is also considered as “the value expressing the accuracy of the test in extracting stable results if the test is repeated more than once on the same sample to give close results” [7] . It was used to calculate the reliability coefficient by (test and re-test method) with an interval between the first and second tests (7) days. Ibrahim Salama explains that "the method of re-testing is one of the most simple methods, as it is characterized by the determination of the interval of coherence, because the error associated with the measurement, fortunately, is always more clear when there will be a period between the implementation of the two tests, from one day to more" [8] .

The researcher extracted the reliability coefficient by means of the correlation coefficient (Spearman ranks) between the results of the first test and the second test, and extracted the significance of the correlation through (T) for morality, the researcher has concluded that the basic skills tests have high significance, because all the calculated (T) values are greater than the tabular value of (2.77) and with a degree of freedom (3), which indicates that the tests enjoy a high degree of stability as shown in table (2).

Objectivity:

Objectivity is defined as “the extent to which the arbitrator or examiner is liberated from subjective factors” [9] . That is, the test is not subject to subjective estimations, and in order to extract objectivity values, the objectivity of the test must be used, which indicates that “the estimators do not differ in judging something or a particular subject” [10] , the researcher used the correlation coefficient (Spearman’s ranks) for the objectivity of the tests between the scores of the first and second judgments. The data showed that all the tests have high objectivity and that they have significant significance because the calculated (T) values are greater than the tabular (T) value of (2.77) at the level of significance (0.05) and a degree of freedom (3). As shown in Table (2).

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Table(2) it shows the reliability and objectivity coefficient of the tests:

N	Tests	Reliability coefficient	T sig	Objectivity coefficient	T sig	Sig type
1	Serves	0.90	8.04	0.88	7.18	Sig
2	Forehand	0.88	7.18	0.86	6.50	Sig
3	Backhand	0.85	6.20	0.82	5.56	Sig

Pre-test :

The researcher conducted the tribal tests for the research sample on (Sunday) corresponding to 10/1/2021 before starting the main experiment with all variables adjusted.

Sample equivalency procedures:

In order to equalize the research groups among themselves, the researcher worked by relying on the tribal test for all basic skills and by applying the statistical method for the results of the tribal tests, as it indicates that the differences between the two groups are not significant in these tests, and this confirms the equivalence of both groups before conducting the field experiment. As shown in Table (3).

Variables	Groups	Mean	Std. deviation	T value	Sig level	Sig type
Backhand	Control	30.3333	0.81650	0.674	0.515	Non Sig
	Experimental	30.0000	0.89443			
Forehand	Control	28.5000	1.04881	0.520	0.614	Non Sig
	Experimental	28.1667	1.16905			
Serves	Control	57.3333	0.81650	0.368	0.721	Non Sig
	Experimental	57.1667	0.75277			

Special exercises according to the multidimensional mental visualization:

Through the field experience of researchers, consultation with the supervisors, and access to the educational curriculum of the Al-Durra Specialized Center trainer, a set of special exercises (Appendix 1) were prepared according to the multidimensional mental visualization, as well as using a number of aids.

1. The total number of serving skill exercises (6).
2. The total number of exercises for the skill of the forehand strike was (6).
3. The total number of exercises for the back ground kick skill was (6).
4. Special exercises were applied within the main part of the educational unit with a time of 63 minutes.
5. The number of educational units in which the exercises were applied is (16).
6. The exercise continued from 15/1/2021 to 17/2/2021.
7. The researcher relied on the principle of repetition, excitement and suspense through the application of exercises.
8. The exercises included the dimensions of mental, visual, auditory, sensory and kinesthetic perception.

Where he applied special exercises according to a multi-dimensional mental visualization on the vocabulary of this program after reviewing the relevant sources and references, and the

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researcher also conducted personal interviews with many experts in the field of motor learning, training and tennis to develop the appropriate special exercises And the special duties according to the mental multi-dimensional perception and how to apply the aids during the main experience in line with the abilities of the players aged (11-13) years in tennis. Where the educational program started on (Friday) corresponding to 15/1/2021 and was completed on (Wednesday) corresponding to 17/2/2021.

The training units consisted of (32) units divided equally for the two groups, meaning (16) educational units for each group and by (3) units per week for each group, and the unit time was (90) minutes for a period of (5) weeks.

Post-test:

The researchers conducted the post tests on (Tuesday) corresponding to 16/3/2021 after completing the implementation of the educational program for special exercises according to the mental multidimensional visualization in one day, taking into account the same conditions in the tribal tests.

Statistical means used in the research: (11)

1- Mean
2- Std. Deviation
3- correlation coefficient (Spearman)
4- Ki^2

Presenting and discussing the results of the basic skills tests for the control group:

After collecting the data and processing it statistically, the researcher reached a number of results that he decided to display in the form of tables. Table (4) shows the arithmetic means, standard deviations, and the calculated (t) value for the pre and post-tests of the control group members in the research variables.

Variables	Pre-test		Post-test		T test value	Sig level	Sig Type
	Mean	Std. deviation	Mean	Std. deviation			
Backhand	30.33	0.865	35.33	2.732	3.79	0.013	Sig
Forehand	28.50	1.048	34.00	1.788	6.21	0.002	Sig
Serves	57.33	0.850	71.16	1.169	18.46	0.000	Sig

Table (4) shows that the calculated (t) value was greater than the statistical value and below the significance level (0.05), which indicates a significant difference between the two tests and in favor of the post-test in all the variables studied.

Discussing the results of the basic skills tests for the control group

We notice in Table (4) that there is a development in the control group in the basic skills (forward kick, backhand, serving). The researcher attributes the reason for the development of the control group to its regularity with the educational units assigned to it according to the usual curriculum by the coach of the Specialized Center for the game of tennis, as well as the

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repetitions in performance and the continuation of the application of the units designated for teaching basic skills in the game of tennis.

This was confirmed by (Qassem, 1998) "The goal of this stage is to acquire motor skills in general, not complete mastery and stability of the art of motor performance. Rather, the main purpose of this should be their acquisition of the ability to perform various movements to an acceptable degree, with the ability of the learner to be economical in making the effort." . [(12)]

Therefore, we find that the control group has achieved a difference in learning the basic skills under study as a result of repetition and practice through the educational units in which the method used by the trainer was used. The main objective of each unit is to deliver the material to be learned to the learner, and also that the development of the skill level is due to The members of the control group obtained the repetitions for each skill, with the role of the trainer appearing greatly in the method followed by him, as he directs the learners during the period of education to learn the skill, "as the guidance factor is one of the most important factors in the learner's acquisition of movement". [(13)]

Presenting and discussing the results of the basic skills tests of the experimental group:

After collecting the data and processing it statistically, the researcher reached a number of results that he decided to display in the form of tables. Table (5) shows the arithmetic means, standard deviations, and the t-value calculated for the pre and post-tests of the experimental group members in the research variables.

Variables	Pre-test		Post-test		T test value	Sig level	Sig Type
	Mean	Std. deviation	Mean	Std. deviation			
Backhand	30.00	0.884	41.16	1.169	15.88	0.000	Sig
Forehand	28.16	1.176	40.50	1.048	20.06	0.000	Sig
Serves	57.16	0.752	91.16	1.752	76.02	0.000	Sig

Table (5) shows that the calculated (t) value was greater than the statistical value and below the significance level (0.05), which indicates that there is a significant difference between the two tests and in favor of the post- test in all the variables investigated.

Discussing the results of the basic skills tests of the experimental group.

The results of the pre and post-tests of the skills under study, as shown in Table (5), showed that the experimental group followed an educational approach to multi-dimensional mental visualization using special exercises and auxiliary tools that led to the development of (forehand, backhand, serve) among the players, and this is clear through the results of the post-tests of attentional control and basic skills under study, the researcher attributes this development to the experimental research group as a result of the positive impact of the prepared educational curriculum and its various exercises that were prepared according to the multi-dimensional mental perception (visual, auditory, and kinesthetic) as well as the use of aids that were given during the educational units with the availability of conditions that are commensurate with the

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nature of the learner and his educational environment, in a way that raises the learners' motives and access to optimal performance through the use of educational means that help develop basic skills (forward kick, backhand, serving)

The researcher also believes that the auxiliary tools that were used had a positive role in receiving the stimulus, which leads to the formation of better images of the skill to be learned, and thus the formation of more comprehensive motor programs, which in turn leads to better learning. The experiences and information gained by the learners during the educational units, and that the moral differences of the post-tests that characterized the experimental group came as a result of the desire and motivation of the learners and diversity, as the desire and motivation of the learner were born to make him reach a level of good performance, especially when the researcher reinforced the educational curriculum with a large number of various exercises within the multidimensional mental perception that was giving it to learners, and making each learner perform exercises according to variable stimuli according to the auxiliary tools used in the research led to an increase in interaction between learners and thus led to an increase in the process of development in the basic skills under study. So that the work of these exercises varied according to the dimensions of mental perception, with an emphasis on the correct performance during the application of the skills, which made the progress of the learners clear in these skills.

Presenting and discussing the results of the basic skills tests of the two experimental and control groups after the study:

After collecting the data and processing it statistically, the researcher reached a number of results that he decided to display in the form of tables. Table (6) shows the arithmetic means, standard deviations, and the calculated t-value for the post-test of the experimental and control groups in the research variables.

Variables	Pre-test		Post-test		T test value	Sig level	Sig Type
	Mean	Std. deviation	Mean	Std. deviation			
Backhand	35.33	2.732	41.16	1.169	4.808	0.001	Sig
Forehand	34.00	1.788	40.50	1.048	7.678	0.000	Sig
Serves	71.16	1.169	91.16	1.752	35.23	0.000	Sig

Table (6) shows that the calculated (t) value was greater than the statistical value and below the significance level (0.05), which indicates that there is a significant difference between the two groups and in favor of the experimental group in all the variables studied.

Discussing the results of the basic skills tests for the post-experimental and control groups:

Through the table (6) concerned with the presentation of the post results of the control and experimental groups, there are statistically significant differences in the basic skills (backhand, forehand, serve) and in favor of the experimental group that uses special exercises according to a multidimensional mental perception (visual dimension and auditory dimension) and kinesthetic

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dimension) using aids that were given to the learners in the experimental group in developing the studied research variables.

The researchers attributes the moral differences in the experimental research sample to the various mental visualization exercises (visual, auditory, kinesthetic) using auxiliary tools that were introduced in the vocabulary of the educational curriculum, especially in the main section of the educational units, which helped to move the energies inside the learners due to the excitement, challenge, suspense, enthusiasm and impulse of this exercise towards the learning process.

As well as the amount of information received by the learner, which increases the quantity and quality of feedback. He states (Yarub Khion 2002) "that feedback is the strongest and controlling variable on the learner's performance, and that there was no improvement without feedback [(14)] , and the instructions and directions that The learner receives among the group members makes the learner an active and effective element in the learning process and not just a receiver of information, unlike the instructions and directions he receives from the trainer only. It is mentioned (Tawfiq Ahmed, 2003) “As the learner performs the skill with his peers and watches his group perform this skill, this leads to better learning by enhancing performance by watching and correcting errors” [(15)] .

The researcher emphasized that the auxiliary tools have an important and effective role in learning the skill to be learned, because the educational auxiliary tools help the learners to quickly learn and master the skills, as the researcher used auxiliary tools with different stimuli that helped to use the perception perceptions of the skills to be learned in addition to knowing the sense of performance, also, displaying a sample of images in the form of visual posters and datachew helped draw the correct movement and stored many motor programs inside the brain, and this is confirmed by (Saad Mohsen, 1996) (the use of educational aids under the supervision of a specialist under good educational conditions in terms of place, time and tools used contributes to simplifying the learned material [(16)] .

In addition to all of the above, the learners began to perform the movement from its inception during the re-exercise and its repetition without wasting time in introducing extra movements that do not serve the learning process, which led to achieving the goal and raising the level of skill performance and gaining the learning that comes from special exercises prepared, practice and repetition by the learners according to specific times of performance, and this was confirmed by (Wajeeh, 2000) that “repetition and training give the skill more mastery, competition and more accurate kinetic brilliance [(17)] .

Conclusions and recommendations:

Conclusions: Based on the research results reached within the limits of the research community, the following conclusions have been reached:

1- The special exercises according to the mental multi-dimensional visualization using the aids greatly helped in learning some basic skills in the game of tennis (the forehand, the backhand, the serve).

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2- The use of aids that serve the skill requirements have a positive effect on the development of performance for the skills under study.

Recommendations:

1- The use of special exercises according to the mental multi-dimensional visualization using aids in learning basic skills because it contains exercises for multiple dimensions (visual, auditory, sense-motor) and this facilitates the learning of basic skills significantly and effectively.
2- Conducting similar studies on other individual and collective activities, and on different age groups.

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Appendix

Multidimensional mental visualization exercises supplement

1. A (visual) exercise using virtual reality glasses to watch the performance of the exercise for each skill in slow motion and its performance in conjunction with the presentation.
2. Exercise (visual - kinesthetic) players perform the serve from a sitting position on the knees of the legs in the red zone
3. The serves and cones exercise on the head (kinesthetic sense) to adjust the motor path of the serves.
4. An exercise on the serves and coloring the transmission areas in two different colors and we ask that the serves be performed on the red color (optical).
5. The serve exercise by placing a tape at a height of 1 meter above the net and we ask the player to serve and the ball is between the tape and the net (kinetic sense).
6. The transmission exercise using the top spin pro device column to adjust the motor path of the transmission.
7. (Visual) exercise using virtual reality glasses to see the motor path of performing the ground forehand.
8. An exercise using the top spin pro device to learn the forehand ground kick (kinesthetic sense).
9. An exercise to perform a forehand ground kick by dividing the field into colored areas and playing on area No. (1) (visual).
10. An exercise using the fill n Drill device to learn the ground forehand (kinetic sense).
11. An (audio) exercise with the coach by hearing the coach’s instructions and hitting the ball in the area requested by the coach in instructing the forehand to the ground.