

# The effect of exercises using a factory device to develop the speed of the visual and auditory motor response of youth volleyball players

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The first chapter included the introduction to the research and its importance, and the researchers dealt with the advantages of the volleyball game, which has specific features that distinguish it from other group games, and the importance of the sense of sight and hearing. To get them to the best possible level.

As for the research problem, it is through the researchers' experience and their observation that the kinetic response is being trained in traditional ways and means, so they decided to prepare exercises with a device manufactured with visual and auditory stimuli to develop the speed of the kinematic response of young volleyball players.

As for the objectives of the research, they were:

- 1- The manufacture of an electronic device with visual and audio stimuli to develop the speed of the kinematic response of youth volleyball players.
- 2- Preparing exercises using a factory device to develop the speed of the visual and auditory movement response of youth volleyball players

As for imposing research, it was:

- 1- There are statistically significant differences between the results of the pre and post tests and in favor of the post tests.

As for the second chapter, the researchers used the experimental method using the method of one experimental group with two pre and post tests. The research sample was chosen by the deliberate method. They are the young players of the Police Sports Club, whose number is (14) players aged (16-18) years.

As for the third chapter, the extracted statistical results are presented, analyzed and discussed.

In light of the experiment carried out by the researcher and the results achieved through tests and statistical means, the researcher reached conclusions, which are:

1. The different and varied motor response speed exercises of the visual and auditory system helped to develop the speed of the kinematic response of volleyball players.
2. The manufactured device helped improve the kinetic response speed of volleyball players.
3. The use of multiple stimuli in one exercise leads to giving the player the movement programs difficult requirements (which are somewhat similar to the playing conditions) and with regular repetitions, which adjusts the player to those stimuli and increases the experience and then reduces the time of the movement response to him.

The researchers included in their study recommendations, namely:

1. The use of modern equipment in exercises because of their importance in developing the speed of the motor response.
2. Relying on advanced and modern equipment when building tests because they reflect the true level of individuals, far from bias.
3. Paying attention to exercises to develop speed using multiple and varied stimuli, provided that the performance is from movement (ie, linking more than one movement in a single exercise).

## **Definition of Research:**

### **1.1 Research introduction and its importance:**

The progress in the level of performance of sports was a result of the use of modern scientific methods and means in order to develop the state of the individual athlete and bring him to the highest and best levels in the type of activity practiced.

Volleyball is one of the games that has advantages that distinguish it from other group games, because it is not limited to a specific time, the small area of the playground is its own, and the players move from offensive to defensive duties and vice versa, as well as it contains many technical skills, which are the purposeful and

variable movements that the player needs to perform. In the fastest time and with the least possible effort, in addition to being the strong pillar on which the game is built, the player's access to the stage of accuracy in skill performance depends on many variables, including visual and audio variables and the means used that are commensurate with the type of skill and volleyball game.

Sight is one of the most important sources of information reception that serves all body functions by learning about the external environment and giving us information about everything that is going on around us, including movements, moving things, or objects passing in front of us, or the flight of balls, their speed and approach, and the second source of information is hearing, which helps the individual to Adaptation and compatibility with the surrounding environment, as well as the individual can determine the location of things and their position from it, whether in terms of its proximity or distance from it, and through the above, the importance of research lies in preparing exercises with a device manufactured with visual and auditory stimuli to develop the speed of the movement response of young players in volleyball to reach them to the best Possible level.

### **1.2 Research Problem:**

The game of volleyball is one of the games in which the player needs to reach excellence in the accuracy of skill performance, which enables him to play the game properly and legally, as well as that the speed of the ball during the performance of technical skills requires players to respond quickly and accurately which is consistent with the requirements of the skill, and from During the experience of the researchers, they noticed that the movement response is being trained in traditional ways and means, so they decided to prepare exercises with a device manufactured with visual and audio stimuli to develop the speed of the kinematic response of young volleyball players.

### **1.3 Research Objectives:**

- 1- The manufacture of an electronic device with visual and audio stimuli to develop the speed of the kinematic response of youth volleyball players.
- 2- Preparing exercises using a factory device to develop the speed of the visual and auditory movement response of youth volleyball players.

#### **1.4 Hypothesis of research:**

- There are statistically significant differences between the results of the pre and post tests and in favor of the post tests.

#### **1.5 fields of research:**

- 1- The human field: Youth players of the Police Sports Club aged (16-18) years in volleyball for the 2019-2020 sports season
- 2- The temporal domain: the period from 1/9/2019 to 1/2/2020
- 3- Spatial domain: Police Sports Club Hall / Baghdad.

### **2- Research methodology and field procedures:**

#### **2.1 Research Methodology:**

The researcher chose the experimental method in the style of one experimental group with two pre and post tests, due to its suitability to the nature of the research.

#### **2.2 Research Sample:**

The research community consisted of (74) players representing six clubs from the Elite Youth Clubs League of ages (16-18) for the sports season (2019/2020). The sample is 18%.

#### **2.3 devices and tools used in the Research:**

1. A device for measuring and developing the speed of the kinematic response to visual and auditory stimuli.
2. Colored markers.
3. A legal volleyball court.
4. (metric roller) tape measure, count (1).
5. Adhesive tape.

##### **2.3.1 Auxiliaries:**

1. Arab and foreign sources.
2. A form for collecting data and information when registering the tests used in the research.
3. Internet network information.
4. Tests.

5. Auxiliary work team<sup>1</sup>.

- Factory audiovisual system:

The device designed by the researcher is a training educational device that was manufactured to measure and develop the speed of the kinetic response with visual and audio stimuli and in many games and events, including volleyball as well as the fun of training and can be used by all levels of sports, and the device gives a package of numbers, colors and randomly from Through its parent device and the automatic speaker, that is, mentioning a number or color of four numbers and colors without a sequence and the device consists of several parts linked with each other, and these parts are:

1- The parent device: which contains multiple buttons, namely:

- ON-OFF-OFF button.
- The switch from the audio system to the visual system.
- A button to start each player's eight attempts.
- One-person switching operating system button.
- Eight new attempts restart button.
- Screen displaying the number of attempts and the time of each attempt for each player.

2- The signal triggering device for the optical and audio stimuli (ON-OF), which is placed inside the character and is connected with the parent device in a wireless manner.



**Figure (1)** shows the parent system

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<sup>1</sup> 1- Lecturer, Dr. Riad Mazher  
2- Games coach Akil Bahjat



**Figure (2)** shows the device for operating the signs for visual and audio stimuli

- 3- The sensory device through which the time is stopped when the player touches it upon reaching an end point, and its place is at the top of the person.



**Figure (3)** shows the sensitive device

- 4- The sign, which contains inside the operating device and the sensor device, as for the outer shape of it, it contains one of the four numbers and a light for one of the four colors.



**Figure (4)** shows the figure for the manufactured device

#### **2.4 Tests used in the research:**

After reviewing the scientific sources and previous studies to determine tests that are compatible with the nature of the subject of the study, the researcher did not find what is appropriate due to the specificity of those tests in measuring the speed of the movement response to visual and auditory stimuli using an accurate measuring device, so the researcher decided to amend these tests in order to obtain accurate results that reflect the level of Individuals of the research sample in an accurate manner without any bias, noting that the opinions of experts in the field of tests, measurements and volleyball () were taken into consideration, as well as the scientific conditions for the test (validity, consistency, objectivity) were made.

First: The test of the speed of the selective motor response to the auditory stimulus 1:

The purpose of the test:

Measurement of the ability to rapid and accurate motor response according to the choice of the stimulus.

#### **Tools :**

Legal volleyball court, four digit launcher, tape measure, tape.

#### **Measures :**

The test area is planned with four points. Each point represents one of the four numbers, the distance from the side between one point and another is 3 m and the distance between the starting point and the four points is 6.40 m. The starting point is determined in the middle of the end line of the volleyball court so that the four points are in the shape of a crescent in order to ensure that the distances are All points are equal with respect to the starting point, and the number launcher is placed on the starting point, as shown in Figure (5).

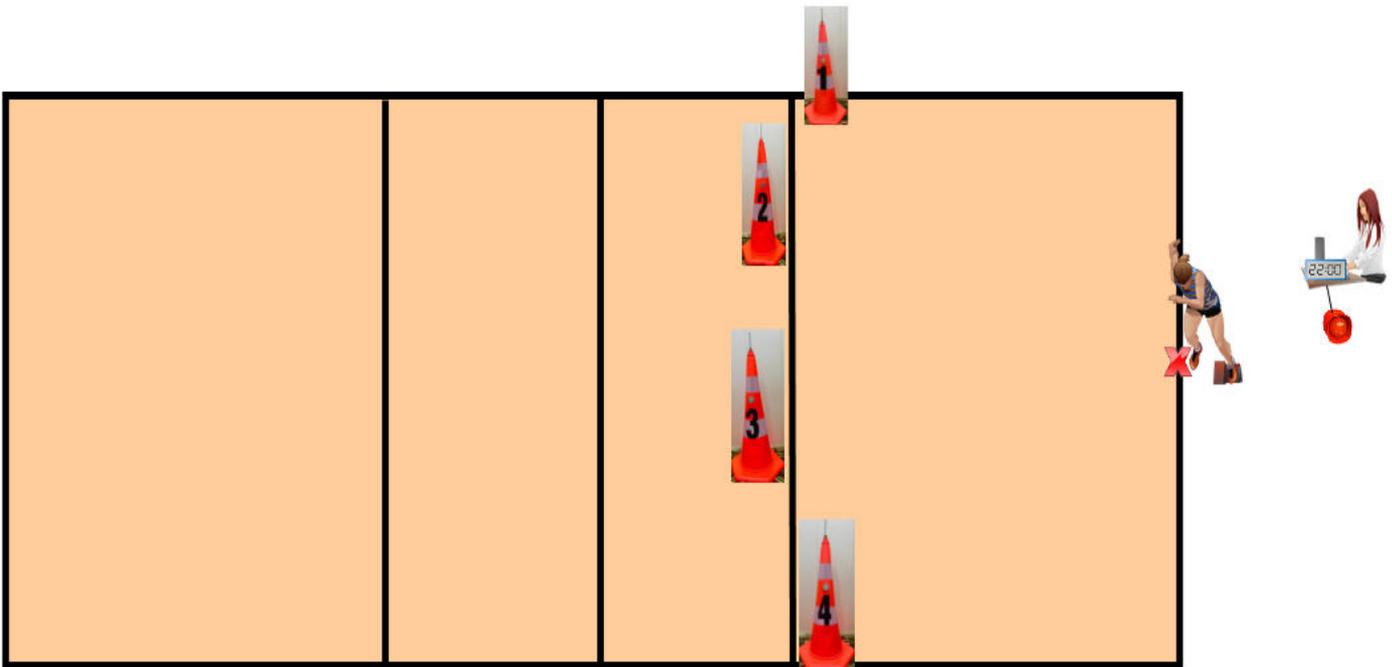
Test description:

- The tester stands at a point.

- The tester takes a ready position, with the starting point under one of his feet, and his body bends forward slightly and looking toward the arbitrator.

**Figure 5:**

- The laboratory responds to one of the four numbers fired by the device and tries to run as fast as possible in the specified direction to reach the specified point 6.40 m away from the starting point.
- When the laboratory reaches the required person, it touches the sensor at the top of the person to stop the attempt time.



- If the laboratory starts running in the wrong direction, time continues in the device until the laboratory changes direction, reaches the correct direction and touches the sensor.
- The laboratory is given (8) consecutive attempts between each attempt and the other (10) seconds, with two attempts in each of the four numbers.
- The attempts in each of the four numbers are determined in a successive random manner.

**(The test demonstrates the speed of the motor response to an auditory and visual stimulus)**

**The conditions :**

- Each laboratory is given a number of attempts outside the test itself, the basic conditions, in order to familiarize with the test procedures.
- The laboratory should not be aware that it is required to perform eight attempts divided into two attempts for each number, and this procedure is also important to reduce the laboratory's expectation.
- The laboratory must be alerted that the number of attempts that it will perform is not distributed evenly among the four numbers, but it is possible that the number of attempts of one number is more than the other, and that the order of performance of the attempts is random and differs from one laboratory to another.
- The test should begin with the arbitrator giving the following indication:
  - Prepared and at all attempts.

**Registration :**

Calculates the time for each attempt.

The laboratory score is: The average of the eight attempts.

**Second:** The test of the velocity of the selective kinematic response to the **visual stimulus 1:**

**The purpose of the test:**

Measurement of the ability to rapid and accurate motor response according to the choice of the stimulus.

Where the conditions for the visual test are the same as for the auditory test, except for the visual stimulus, which appears instead of the auditory stimulus in the first test.

**2.5 Exploratory Experience:**

The researcher conducted the reconnaissance experiment for tests and exercises on Tuesday 3/9/2019 in the hall of the Specialized Volleyball School in Baghdad on the poll sample of (10) players of (16-18) years old.

**2.6 scientific foundations of the test:**

**2.6.1 Test validation:**

As the tests were presented to the specialists and experts (\*) and they agreed that this device and the test measures the characteristic or ability that was put to measure it.

### 2.6.2 Test Stability:

The reliability coefficient was found by applying the tests to a sample of (3) players, and the test was re-applied after seven days.

### 2.6.3 Objectivity:

The objectivity of the measurement means ((Little or no difference in the method of evaluating the measurement for the testers, regardless of the arbitrators differing in it, and the less the difference between the arbitrators, this indicates that the measurements are objective)).

Since the tests used in this study are clear and not subject to interpretation, and far from self-evaluation, registration in them is done using units representing (seconds). Therefore, the tests used are considered to be of good objectivity and this was done by using two arbitrators (\*) and Table (1) shows that.

Table No. (1):It shows the coefficient of stability and objectivity

T	the exams	Stability coefficient	Factor of honesty
1	The speed of response to the auditory stimulus	0,92	0,98
2	The speed of response to the visual stimulus	0.94	0.97

### 2.7 pre-tests:

The pre-tests for the experimental group were conducted on Sunday (15/9/2019). The tests were conducted under the supervision of the researcher and with the help of the auxiliary team specialized in the game of volleyball.

### 2.8 Key Experience:

The researcher prepared the exercises and their application was as follows. (12) training units were implemented in which the exercises were applied using the device manufactured in the main section of the training unit. / 9/2019 Until Thursday (10/24/2019), the number of training units reached (12) training units and the total time for the total weekly training units was (60) minutes and by (30) minutes from the main section of one training unit.

## 2.9 Dimensional Tests:

After completing the training modules, the post-tests of the experimental group were conducted on Friday 25/10/2019.

## 2.10 statistical methods:

The researcher used the statistical bag (SPSS):

## 3 Presentation, analysis and discussion of results:

The researcher presented the findings and discussed them to identify the effect of exercise using the proposed device to develop the speed of the visual and auditory motor response of volleyball players.

### 3.1 Presenting, analyzing and discussing the results of the pre-post tests.

#### 3.1.1 Presentation, analysis and discussion of the results of the pre and post tests of the experimental group.

**Table (2):** shows the arithmetic mean, standard deviations, calculated (t) value, error rate and significance for the pre and post tests for auditory and visual motor response velocity

Variables	The pretest		Post test		Calculated (T) Values	mistake percentage	indication
	s	P	s	P			
The speed of response to the auditory	1.94	0.23	1.91	0.22	3.32	0.01	moral

<b>stimulus</b>							
<b>The speed of response to the visual stimulus</b>	<b>1.96</b>	<b>0.24</b>	<b>1.85</b>	<b>0.19</b>	<b>4.62</b>	<b>0.00</b>	<b>moral</b>

With a level of significance (0.05) and with a degree of freedom (n-1)

**Analysis:**

Through the results presented in Table (2) of the experimental group, the arithmetic mean of the pre-test of the speed of the kinetic response to the auditory stimulus was (1.94) and a standard deviation of (0.23). The arithmetic mean of the pre-test of the speed of the kinetic response to the visual stimulus reached (1.96), with a standard deviation of (0.23). (0,24)

As for the arithmetic mean of the post test of the speed of the kinetic response to the auditory stimulus (1.91) with a standard deviation of (0.22), while the arithmetic mean of the post test of the speed of the kinetic response to the visual stimulus is (1.85) with a standard deviation of (0.19)

The values of (T) calculated are (3,32) for the auditory stimulus (4,62) for the visual stimulus at a degree of freedom (11) and with a significance level (0.05), which indicates the presence of statistically significant differences in favor of the post-tests.

Discussing the results:

It is evident from Table (2) that there are significant differences between the pre and post tests of the experimental group and in favor of the post-tests in order to achieve the first research hypothesis.

The researcher attributes this to the extent of the effectiveness of the exercises using the manufactured visual and audio device and the emphasis on the principle of repetition, as the training was carried out gradually from easy to difficult, and the extent of the impact of using the devices for the purpose of developing the speed of the motor response through the performance and repetition of exercises in a manner that amounts to being close to the circumstances. Playing, taking into account the change in the exercise and its multiplicity as well, the player's impulse towards the

performance of modern and easy-to-use devices that were not previously used as the designed device raises the player's curiosity in trying what is new makes him that any player perform repetitions with confidence and desire and work towards the better and thus this indicates that the trend The indicator is towards the positive effect of exercises, and giving the player the opportunity to perform exercises at a slow speed during the first repetitions allows clear vision, which allows him to correct the tracks and then reduce the time of the motor response.

Exercise is the performance or completion of a specific task or a duty repeatedly intended to bring the acquired skill into its full form, and among the basic principles of the exercise of the exercise, which he laid down ((singer1980) is the type of exercise and means the manner in which the exercise is performed and depends on motivation and repetition, avoiding errors and awareness of the conditions of the exercise environment. And his cases, as these concepts have goals, which are the clear and current change in the form of movement performance to reach an advanced level in performance and control or control performance (1).

And that the correct and continuous implementation of these exercises reduces response time, which adapts the player for this purpose and provides the opportunity to refine their talents.

Whenever there are many iterations in response to a specific stimulus, this will accelerate the decision-making and then shorten the reaction time and increase its speed (2).

The use of the device also had a great impact by activating the kinetic programs when exposing the athlete to different stimuli, which helped the players in diverting attention between stimuli and repeating them through various exercises, and this in turn means an increase in experience and then a reduction in the time to choose the response and thus speed in the decision-making all of this is good The level of performance of the players.

When there is a variety of stimuli at different speeds, the athlete has decisions to determine the appropriate response to those stimuli by responding and refraining from each other, in other words, the distinction must be made quickly between the different stimuli, and when there are two or more stimuli, two or more must be employed. Responses are in quick succession and this is common in ball games (1).

#### **4- Conclusions and Recommendations:**

##### **4.1 Conclusions:**

The researcher reached the following conclusions:

- 1- The different and varied motor response speed exercises of the visual and auditory system helped to develop the speed of the kinetic response of the young volleyball players.
- 2- The device manufactured by the researcher helped in developing the kinetic response speed of the young volleyball players.
- 3- The use of multiple stimuli in one exercise exposes the player's movement programs to difficult requirements (which are somewhat similar to the playing conditions) and with regular repetitions, which adjusts the player to those stimuli and increases the experience and then reduces the movement response time to him.

##### **4.2 Recommendations:**

- 1- 1 - The use of modern equipment in exercises because of their importance in developing the speed of the motor response.
- 2- Relying on advanced and modern equipment when building tests because they reflect the true level of individuals, far from bias.
- 3- Paying attention to exercises to develop speed using multiple and varied stimuli, provided that the performance is from movement (i.e. linking more than one movement in a single exercise).

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## **Appendices**

### **Accessory (1)**

#### **Visual and auditory motor response speed exercises**

1. Exercise standing on the combs on the finish line of the volleyball court and the signs in front of the player with the audio system. When one of the numbers is heard, they will go at full speed towards the offensive line, where the four signs are placed on the offensive line.
2. The same previous exercise using the visual system.

3. The same previous exercise with the player sitting long and back toward the signs, using the audio system.
4. The same previous exercise using the visual system.
5. The same previous exercise with lying on the back and legs towards the signs, using the audio system.
6. The same previous exercise using the visual system.
7. The long sitting exercise in the middle of the stadium. The signs are placed in the corners of the stadium with the audio system. When one of the numbers is heard, the maximum speed is set towards the specified number.
8. Exercise lying on the back in the middle of the stadium and the signs are placed in the corners of the stadium with the audio system, when one of the numbers is heard, the maximum speed is set towards the specified number.
9. Exercise lying flat on the abdomen in the middle of the stadium. Signs are placed in the corners of the stadium with the audio system. When one of the numbers is heard, the maximum speed is set towards the specified number.
10. Exercise standing in defense, and the signs are in the form of a square minus a rib, and the player is in the middle of the audio system when hearing one of the numbers, starting at full speed towards the specified number.
11. The same previous exercise using the visual system

