

Visual spatial attention and its impact on the accuracy of the diagonal spike in volleyball

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ABSTRACT

The primary aim of this research was to study visual spatial attention and its impact on the accuracy of the diagonal spike in volleyball. A total of 20 volleyball players of Baghdad participated in this study. The sample was homogeneous in terms of height, weight and age of the players. The tests used in the present study were: 1) Visual Spatial Attention Test. 2) Volleyball Spike Test. Based on the findings of the study, the researcher concluded that visual spatial attention has a significant impact on the accuracy of the diagonal spike in volleyball.

KEYWORDS

Visual spatial attention; accuracy; diagonal spike; volleyball

1. INTRODUCTION

Volleyball is one of the most popular indoor games in the world that has occupied a wide space among fans and followers. Volleyball is a game of speed in which the concentration of the players at the right place counts the most. It is characterized by the continuous exchange of the ball between offensive and defensive skills that require the key ability of attention and focus on what is important and block out everything else. Each voluntary movement performed by an individual is the result of group action of the muscles depending upon the type of the work and the amount of force to be used. The work in performance of these movements require a certain level of compatibility between sensory and kinesthetic systems.

Continuous performance of the mental and executive functions of the brain will positively reflect on the tactical side and will help in raising the skills and abilities of the players. Mental activities and

exercises in the regular training work outs good to eliminate fatigue, storing up a maximum amount of pre-match energy and preventing pre-game excitement and nervousity. It also plays an important role in mastering and developing basic skills in volleyball like the Volleyball Spike Test. It requires individual and collective compatibility in the form of eye-hand coordination.

The present study aimed to examine and evaluate mental abilities of the volleyball players using computerized and modern cognitive tests including visual and spatial attention test with the Vienna Test System, and to implement mental exercise in the regular training schedule of the players to develop accuracy in the performance of the Volleyball Spike Test among volleyball players.

The ultimate goal of the volleyball player is to score points for the team and to win the game by performing the basic skills, such as serving, spiking and blocking, with accuracy and precision. A player must be proficient to perform the skills. The mental processes like attention and concentration greatly help the players in achieving their goals in the game. The serving skill requires deep focus on the position of the weak players of opponent team, or at a place where there is a defensive gap. To the best of the researcher's knowledge, the researcher found that training coaches do not give appropriate interest to include mental exercises during the design and development of the training curricula. They usually do not use specialized computerized mental tests, and this is reflected negatively on the players' ability. Most of the training coaches use pencil tests (questionnaires) for examining and evaluating the executive functions of the players that need large sample. The volleyball clubs in Iraq lack specialized psychological laboratories that include modern tests and high degree standards of methods of testing. Adoption of computerized tests may help in objective examination and evaluation of the skills of the players with much ease. The inclusion of mental exercise in training programs may help in raising the level of performance of the players by working on the subjective and specific deficits of the players.

The primary aim of this research was to study visual spatial attention and its impact on the accuracy of the diagonal spike in volleyball. In the current study, the researcher hypothesized that visual spatial attention would have a significant impact on the accuracy of the diagonal spike in volleyball.

2. METHODS

2.1. Participants

A total of 20 volleyball players of Baghdad participated in this study. The sample was homogeneous in terms of height, weight and age of the players. Also, the two research groups (control and experimental) were equivalent (Table 1).

Table 1. Equivalence of the two research groups in the variables studied

	Control group		Experimental group		p
	Mean	SD	Mean	SD	
Visual Spatial Attention Test	7.89	1.67	8.12	1.45	0.50
Volleyball Spike Test	13.56	1.98	14.02	1.63	0.78

2.2. Instruments and procedures

The research tools are the tools that help in data collection with the aim to solve the problem and to achieve the aims and objectives of the research (Mahjoub, 1993). In the present study, many tools and devices were used for the purpose of data collection with the aim to achieve the objectives of the research. The various tools used in the present study included weight measurement device, a computer, a video camera, whistles, adhesive tape, and the Vienna system device for psychological evaluation. The tests used in the present study were: 1) Visual Spatial Attention Test. 2) Volleyball Spike Test.

Visual Spatial Attention Test (Sturm, 2011)

It is one of the tests for attention and perception. This test was conducted with the intent to measure the amount of attention paid by the participant to the external stimuli in the environment or space. The measurement was done using spatial orientation. The test was conducted following two phases, which included: stage of instruction and stage of test application. In the first stage, a set of instructions were given to the participant regarding the purpose, method and benefits of the test. Followed by this, in the second stage, the participant was provided with the training regarding the test to be performed. In this stage, the participant performed the test with the aim to accommodate to the test conditions and method. In the last stage, which was the stage of conducting the main test, the participant performed the test without any additional assistance or instructions.

In this test, the test stimuli were displayed in several locations in the field of view. Each participant was shown triangles with a small square in the middle of it. A picture was enclosed within the square. Triangles were pointed in the outward direction. Participants were asked to focus on the square and the picture enclosed in it. Followed by this, one of the four triangles got lit in black. During the spatial attention test, the participant was asked to press the green switch on the control panel as quickly as possible, noting that the lightning of the triangles is preceded by a warning sign in the centre of the screen displayed for a very short period. In the first stage, an alert sign in the form of an arrow was also there in the centre of the screen indicating one of the locations of the stimulus. This arrow appeared to the participant and quickly disappeared after that to indicate the participant regarding the direction of arrow that would lit up.

In the second stage, no alert sign was given to the participants. Participant was directed to focus on all external areas in the four directions without any other stimuli. The time period between the warning sign and the appearance of the stimulus was very short. The triggers color turned black very quickly. The accuracy of this test depended on the time factor. The scoring was done documenting the reaction time of the participant and the number of errors made by the participant. This test can be conducted in 10 minutes.

Volleyball Spike Test (Taha, 1999)

This test was conducted in a legal volleyball court. In this test the coach prepared the ball for the player standing at position 4. The player was directed to smash in the diagonal direction towards the goal (the rug). A total of 30 attempts were given to each participant. Scoring and registration was done for each correct spike. Four points were given for a correct spike on the target. Three points were given for a spike if the ball fell in the area b, and one point was given for a spike when the ball fell in the area c. After every attempt, a rest for a period of 30 seconds was given to each participant. The coach fixed the height of the ball from the net. The easy ball lob was not counted.

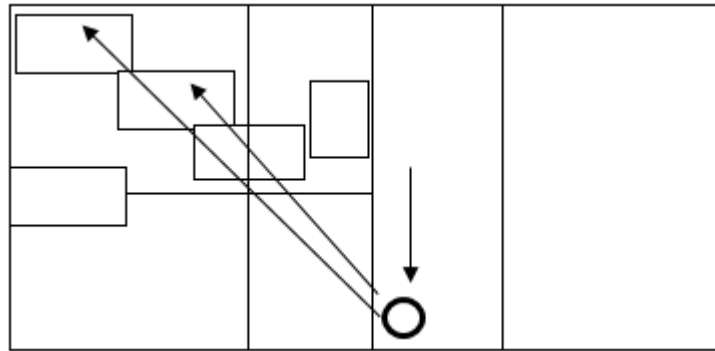


Figure 1. Drawing of volleyball court in the Volleyball Spike Test

An exploratory experiment is a type of initial survey of the circumstances related to the research that the researcher wishes to study (Hashem, 2012). The exploratory experiment was conducted by the researcher on 3 players who did not participate in the primary experiment. The researcher applied a model of mental exercises on the sample participants of the exploratory experiment. The exploratory experiment was conducted with the aim to identify the efficiency of the tools and devices to be used in the main experiment, to identify the obstacles that the research team may encounter, to find the solution for them, and to recognize the suitability of the tests for the research participants.

Pre tests were conducted on the 20 players of the sample on three consecutive days in July 2021, in a volleyball court. The researcher documented and fixed all the conditions related to the tests with respect to the time, place, devices and method of implementing the tests to ensure the same environmental conditions during post-tests. After successful completion of pre-tests, the post-tests were conducted under the same environmental conditions of the pre tests. The post-tests for the selected variables were conducted on two consecutive days in August 2021.

2.3. Statistical analysis

In this study, the statistical analyses were carried out with the Statistical Package for the Social Sciences (SPSS) version 23. The researcher calculated arithmetic means, standard deviations, and t tests.

3. RESULTS AND DISCUSSION

Table 2 describes the results of pre-test and post-test in the variables studied. Visual spatial attention significantly improved from pre-test to post-test, while there was not a significant difference in the accuracy of volleyball spike.

Table 2. Results of pre-test and post-test in the variables studied

	Pre-test		Post-test		Mean difference	t	p
	Mean	SD	Mean	SD			
Visual Spatial Attention Test	57.20	7.85	52.20	8.12	5.00	2.66	0.015
Volleyball Spike Test	53.99	9.68	49.06	6.36	4.93	1.18	0.303

Several factors can contribute to explain these results. First, the increase in attention processes and the increase in the level of perceptual processes is one of the psychological manifestations of the integrated preparation (Odeh, 2007). The psychological and mental preparation must start from the very beginning of the general preparation of the players, including all the vocabulary of the training curriculum. The researcher identified that training coaches did not give much attention to the psychological preparation and the mental training, until the coach agreed to include specialized mental exercises that might affect the skill abilities of the volleyball players.

The findings of this study were also supported by a study conducted by Jabbar (2010), in which the authors stated that the short preparation or lack of direct psychological preparation of the player before participation in the game will not lead to the desired results in the game. A player does not become efficient in a short period of time. There are multiple factors that affect the efficiency of the players, which include the method of implementation of the skills, the mental and psychological preparation of the players to implement these skills, the level of attention of the player when implementing the skills, etc.

4. CONCLUSIONS

Based on the findings of the study, the researcher concluded that visual spatial attention has a significant impact on the accuracy of the diagonal spike in volleyball. Considering these results, the researcher recommends to implement computerized mental tests, such as the Visual Spatial Attention Test and other tests within the Vienna Test System, in sports psychology and research. The volleyball coaches must pay attention to the development of the psychological and mental health of the players by implementing strategies in the training process periodically. Finally, both psychological and physical tests should be used to assist the process of selection of volleyball players.

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AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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