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RESEARCH ARTICLE

The Contribution Rate of Some Mental Abilities Accurately to the Performance of the Stabbing Movement with the Epee Weapon

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Abstract
The research assumed that there is a differentiated contribution to mental abilities (concentration of attention, diversion of attention, perception of the sense of purpose) on the performance of the stabbing movement with the Epee weapon, so the research sample was chosen from the original community, represented by the fencing team for students of the College of Physical Education and Sports Sciences for girls / University of Baghdad, which numbered (20) players and adopted the intentional method in selecting the sample, where we excluded the students who participated in the exploratory experiment, which numbered (4) students. Hence, the research sample became (16) students from the original community. The tests under study have been conducted on them. classification and treated statistically and then concluded the existence of a significant correlation between mental abilities and the accuracy of the performance of the stabbing movement with the Epee weapon.as well as a high contribution rate of mental abilities to the accuracy of the performance of the stabbing movement .In light of the results reached by the two researchers, the need to pay attention to mental abilities in the sports field in general and in the sport of fencing in particular, with the development of a special training curriculum to develop those abilities. The effect of mental abilities in other sports and on different samples, more studies were conducted on the percentage of the contribution of mental abilities of different variables to the level of physical performance and skills in fencing.

Keywords
Contribution rate, Mental abilities, Stabbing movement, Epee weapon

INTRODUCTION

Fencing with weapons is one of the oldest known sports, which is the use of weapons in different ways and methods through defense and attack movements between the competitors, as each of them tries to score touches (points) within the limits of the target of the weapon and the laws agreed upon within the specified time (Maarib &Fatimah, 2022). In the competition between duelists, the ability of the fencer to exert effort and achieve victory depends on many variables, the most important of which are mental, physical, and muscular abilities, through which advanced results can be achieved, the player must be integrated physically (Noor & Fatimah, 2012). psychologically and skillfully can get good results in competitions this sport is characterized by the speed of attack towards the opponent suddenly, and accuracy in directing the fly of the weapon to the opponent's goal, to obtain a touch, any weakness in mental abilities causes weakness in accuracy getting the touch and thus not achieving the desired results in the competitions, Competitions. This sport is characterized by the speed of attack towards (Wafa & Fatimah, 2012).

the opponent suddenly, and accuracy in directing the fly of the weapon to the opponent's goal, to obtain a touch, any weakness in mental abilities causes weakness in the accuracy of obtaining the touch and thus not achieving the desired results in the competitions, mental abilities like the rest of the abilities that are supposed to be interested in every coach in the field of sports

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training are such as physical and skill abilities in importance and no less important than mental abilities (Zeina& Fatima, 2021). Hence, the importance of research in identifying the most important mental abilities and the percentage of their contribution to the accuracy of the performance of the stabbing movement with a shish weapon for fencing players for students of the College of Physical Education and Sports Sciences for Women / University of Baghdad to focus on them by coaches to reach the best results in sports competitions.

A lot of studies, field research, and laboratories dealt with most of the physical abilities of the game of fencing, which have a direct impact on the development of the physical aspect to upgrade the technical and skill side, but most of these studies with training curricula based only on the development of special physical abilities, skill and mental, and to obtain advanced results we must pay attention to the points that have not previously been observed by the coaches and that affect the results and level of the player, which is knowing the percentage of the contribution of both mental abilities in performance and thus employed within the training units, the game of fencing needs special abilities that the coach must know and focus on in the training units to obtain good results.

Identify the most important mental abilities (concentration of attention, diversion of attention, perception of sensation - target) that affect the accuracy of the performance of the stabbing movement with the Epee weapon. Identify the contribution rate of mental abilities that affect the accuracy of the performance of the stabbing movement with the Epee weapon.

There is a different contribution ratio of mental abilities (concentration of attention, diversion of attention, perception of the sense of the goal) in the accuracy of the performance of the stabbing movement with the Epee weapon. The existence of a statistically significant correlation between mental abilities in the accuracy of the performance of the stabbing movement with the Epee weapon.

MATERIALS AND METHODS

Research Methodology

The researcher used the descriptive approach in the method of correlation relations to suit the nature of the problem.

Research sample

The research sample was selected from the original community, represented by the fencing team for students of the College of Physical Education and Sports Sciences for Girls / University of Baghdad, which numbered (20) players and adopted the intentional method in selecting the sample, as we excluded the students who participated in the exploratory experiment, numbering (4) students. Hence the research sample became (16) from the original community.

This article's necessary ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 15.01.2024 Issue/Decision No: 2024/1. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

Tests used in research

Tests of mental abilities

The researcher presented a questionnaire form to nominate the appropriate test to measure muscular abilities in the game of fencing to a group of specialists for the game of fencing also presented the questionnaire form to nominate the appropriate test to measure the degree of concentration and divert attention to a group of experts in sports psychology supplement (1,3,5).

Test (Borden Anfimov) to measure the concentration of attention (Albeik ,1978).

The study required measuring the concentration of attention, which is known as (Borden – Anfimov), and this test is one of the advanced tests for athletes to measure five manifestations of attention (sharpness - focus - distribution - conversion - stability)

Components of measurement

The scale shown in Appendix (7) is a sheet containing (31) lines of Arabic numbers distributed in the form of groups each group consists of (3-5) numbers and each line contains (10) groups, that is, the total number (40) numbers, that is, the test contains (1240) numbers, has been developed in a codified order and sequence as it

was taken into account in its status to be irregular in its distribution and unequal to avoid the possibilities of memorization.

Method of applying the scale

The test is explained to the tested players through their observation of the scale sheet as follows: - Look at the paper in your hands so that you notice the numbers and structures in a good way and try to search for the numbers you are required to write off by putting an italic line on them with pencil, and the tester to take into account the accuracy and speed as much as possible because the duration of the test (one minute) only, where he writes off each group ends with the two numbers (97) and begins with the lines one after the other and from the left to Right, the test begins with the word (I prepare) and when hearing it, the laboratory takes the test paper placed in front of it in an inverted manner that gives the word (I start), so the player crosses out the required numbers and at the end of the test time, which is (one minute) the word (stop) is given, then the (laboratory) puts a line under the last group he reached. This test is performed twice, the first in a quiet place, the second in the presence of a codified sound stimulus, and at the time the word (start) is given, the researcher operates a distracting voice recorder.

Test (Borden – Envimov) to measure the diversion of attention

Aim of the test: to identify the ability of players to divert attention.

Components of measurement

The scale placed in Appendix (7) is a form containing (31) lines of Arabic numbers, each line contains forty numbers, so the test contains (1240) numbers, the numbers in each line consist of groups placed in a codified manner and each of them consists of 3-5 different distribution and order to ensure that they are not saved by the laboratory.

Performance specifications

When the signal (start) the player quickly starts searching for the number (83) and writes it off with a slash when hearing the command (allowance), the player puts a vertical dash and moves to delete the number (49). When hearing the word "stop", the player puts the headline. The command (allowance) gives every (30) seconds / note the test time is two minutes

Sensation perception test – aim

Test objective

Perception of sensation - aim

Used tools

Front-back distance perception measuring device as a sign, eye mask, and fencing weapon.

Sensation perception test – aim

Test objective: Perception of sensation - aim

Used tools: Front-back distance perception measuring device as a sign, eye mask, and fencing weapon.

The use of aim for stabbing

It is five overlapping circles and its area is increasing ascending, the diameter of the small circle (is 2.5) cm followed by (5 cm, 7.5 cm, 10 cm, 12.5 cm, and 15 cm) and the target is determined on a paper drawn by circles of different diameters, and behind the paper there is carbon to print the player's stabs in the paper drawn circles, and the data of each player is written on his target sheet.

Method of describing to performance of the test

The player stands in front of the sign in the cohesion position (sixth) when the start signal is given, the player performs the skill of stabbing the arm straightening from the stimulation position, allowing the player to make three attempts while he is sighted to the target, then the tester blindfolds his eye, and then performs three attempts for the main experiment.

***Test of the accuracy of the stabbing movement*:**

(Makki et al. ,2006).

Test description

The laboratory stands in a standby position in front of the overlapping circles that are placed in front of him and when hearing the word Start performs (10) consecutive stabs at full speed with an emphasis on accuracy.

Recording method

Accuracy is recorded by recording the touches that the laboratory hits on the overlapping circles, as it records the circle number for each attempt and the result is ten attempts and then takes the arithmetic mean for it.

Exploratory experiment

The researcher conducted this exploratory experiment on 28/2/2023, at exactly ten o'clock in the morning in the fencing hall at the Faculty of Physical Education and Sports Sciences on (4) players, and the researcher applied the tests after making measurements for the tests to reach the following.

Knowing the obstacles that the researcher encounters when conducting the main experiment. Determine the accuracy and validity of measurements and tests for research. The extent to which the research sample understands the tests used. Install the tasks of the assistant team. Ensure the validity of the tools and the suitability of the place to carry out the tests. Overcoming the errors that occur in the main experience.

Scientific foundations of the test

The researcher adopted the scientific foundations in the tests to determine the validity of these selected tests, i.e. the extent of their truthfulness, stability, and objectivity.

Validity of the test

The tests vary in the levels of validity depending on their approach and distance from the estimate of the attribute that aims to measure, and because validity is not absolute, but varies from one test to another the researcher deliberately used virtual validity within the sincerity of the content the researcher has verified this validity with the help of a group of experts, the percentage of agreement was taken more than (75%) of their opinions and adjustments were made in the light of their observations on them.

Reliability of the test

To find out the reliability of the test, the researcher used the method of re-testing, that is, "if the test is reapplied to the players themselves, it gives the same results or close results." (Abdul Majeed ,1999) the researcher applied the tests on 2/3/2023 and on a sample of (4) fencing team players who were selected deliberately, then the test was re-applied on 9/3/2023, as the reliability was extracted using the simple correlation coefficient as shown in table (1).

Table 1. Shows the reliability coefficient and correlation significance of the tests.

S	Vocabularies of test	Reliability	Significance
1	Attention Focus	0.81	Sig
2	Attention Diversion / First 30 Seconds	0.89	Sig
3	Attention Diversion / Second 30 Seconds	0.91	Sig
4	Attention Shifting / Third 30 Seconds	0.93	Sig
5	Attention Diversion / Fourth 30 Seconds	0.88	Sig
6	Sensation Perception Test – aim	0.96	Sig
7	Sensation Perception Test – aim	0.90	Sig

It is noted from the table that all the values of the correlation coefficient were greater than the tabular value (r) of (0.00) under the significance level (0.05).

Objectivity of the test

The researcher used a clear and understandable test by the testers, as the recording was made using units of measurement, which are (time, degrees) so this test is of good objectivity, as "the test with good objectivity is the test that removes doubt and disagreement by the testers when applied – (Abdul Majeed ,1999)

The main experiment

The research tests were applied on the days 13/3/2023 until 15/3/2023 and within the following sequence

The first day: Applied tests of mental abilities were conducted on 13/3/2023 in the fencing hall, Faculty of Physical Education and Sports Sciences.

The second day: The researcher conducted the test on the accuracy of stabbing the performance with the Epee weapon on 14/3/2023 in the fencing hall, Faculty of Physical Education and Sports Sciences.

Statistical Methods

SPSS package program was used in the statistical analysis of our research. It was determined by the normality distribution and skewness coefficients of the data. Significance level was determined as P 0.05 and all data were presented as mean standard deviation (SD) unless stated otherwise. The Pearson correlation test was used to measure the relationship between the various variables in this study. Anova was used to compare the scores obtained from the measurements according to categorical variables.

RESULTS

Presentation, analysis, and discussion of the results. Presentation, analysis, and discussion of the results of the research variables under study.

Table 2. Shows the arithmetic means and standard deviations of the variables under study

Variables under consideration		Unit of measurement	Mean	Std. Deviation
Mental abilities	Attention Focus	Sec.	13.33	1.21
	Attention Diversion / First 30 Seconds	Sec.	9.00	1.79
	Attention Diversion / Second 30 Seconds	Sec.	6.83	2.48
	Attention Shifting / Third 30 Seconds	Sec.	8.33	2.58
	Attention Diversion / Fourth 30 Seconds	Sec.	5.33	2.16
	Sensation Perception Test – aim	No.	6,4	1,54
Skill performance	Stabbing motion accuracy	degree	8	1.18

Presentation and analysis of the results and discussion of the correlation and the contribution rate of some mental abilities to the accuracy of the performance of the stabbing movement with the Epee weapon.

Table 3. Shows the value of the link and contribution rate of mental skills to the accuracy of the performance of the stabbing movement

Statistical means	Correlation coefficient value	Error level	Contribution rate	Adjusted value of contribution rate	Correlation significance
Attention Focus	0.65	0.00	42%	38%	sig
Attention Diversion / First 30 Seconds	0.89	0.00	79%	78%	Sig
Attention Diversion / Second 30 Seconds					
Attention Shifting / Third 30 Seconds					
Attention Diversion / Fourth 30 Seconds					
Sensation Perception Test – aim	0.93	0.00	88%	87%	Sig

P<0.05

DISCUSSION

Table (3) showed that the value of the correlation coefficient between the concentration test of attention and the accuracy of the performance of the stabbing movement amounted to (0.65) and the contribution rate was (42%) and the adjusted value of the contribution rate was (38%). Continuous, in addition to the effect of wearing a fencing mask on the level of attention (Al- Haddad, AlTaie & Al-Yasiri, 2022) .

This superiority is logical as one of the most important manifestations of attention that proves its impact on the level of performance in sports activity is the process of focusing attention, that "focusing attention affects the accuracy, clarity, and mastery of the technical aspects of the parts of the motor skill" (Abdel Fattah ,1982) and that the value of the correlation coefficient between the attention diversion test in the accuracy of the performance of the stabbing movement amounted to (0.89) with a contribution rate of (79%) and the adjusted value of the contribution rate was (78%).

This means that the correlation between the attention diversion test in the accuracy of the performance of the stabbing movement was significant correlation when compared to the tabular value of (0.49) at the degree of freedom of 14 and the probability of error (0.05), the researcher attributes the reason for this to the existence of a moral relationship because it is an important ability that every athlete must have and have a good attention shift (Maarib & Fatimah, 2022) . In the sport of fencing, the player is in front of one opponent wearing white clothes, and the value of the correlation coefficient between the test of perception of sensation - goal in the accuracy of the performance of the stabbing movement amounted to (0.93) and a contribution rate of (88%) and the adjusted value of the contribution rate (87%). (Abod & Alhaddad, 2022)

This means that the relationship between the test perception of the sense - the goal in the accuracy of the performance of the stabbing movement was a significant correlation when compared to the tabular value of (0.49) at the degree of freedom 14 and the probability of error (0.05), and the researcher attributes the reason for this to the nature of performance requires the player an important and influential ability to perform the competition which is the ability to perceive the sense - the goal the player needs this ability when performing the stabbing movements carried out by the attacker to get a touch, it is important throughout the competition as a result of tracking the opponent's offensive and defensive movement and blade movements as well as target areas, Alan Perman mentions that this ability is important, especially for sports that require high concentration and speed of movement (Fatima et al., 2017).

In addition, it is clear from the above table that the percentage of perception of the sense of the goal got the highest percentage of contribution, amounting to (88%) because the movements of fencing, in general, must be characterized by accuracy in performance and highlights here the importance of speed and occurrence in the implementation and performance of these movements of the player fencing, whether in the movements of attack, or the movements of defense and for this the perception of the sense - the goal is an important characteristic, which led to the emergence of a high contribution rate in the accuracy of the performance of the movement of stabbing when It is of great importance (Maarib& Fatimah, 2022) . He pointed out that the sport of fencing develops in its practitioners a sense of patience and deep balanced thinking, as it thus gives a wide scope for perception and thinking, and comes in second place shifting the focus of attention, as it obtained a contribution rate of (79%) because the cognitive and technical experiences that characterize the players at the technical and competitive level, which requires more attention to divert attention to contribute to achieving achievement and the championship, which pushes them to pay attention to the manifestations of attention, accuracy, and concentration when performing skills. For any of the basic skills in the game of fencing with a shish weapon to reach them to the best-desired levels (Aziz & Al-Haddad, 2022).

As for the concentration of attention, it got the lowest contribution rate of (42%) during field applications that concern each concentration of attention and the sport of fencing the researcher noted that the focus of attention is consistent with the definition of attention concentration indicates that it is a directive of psychological activity towards one thing or one activity only, the smaller the area of the target to which the touches are directed, the greater the concentration of attention, as the target allowed to touch in the Epee weapon is the smallest space targets in a game Fencing (Fatimah & Susan, 2015).

Conclusions

Through statistical treatments and results obtained by the researcher, the following conclusions were reached. The existence of a moral correlation between mental abilities and the accuracy of the performance of the stabbing movement with the Epee weapon. A high contribution rate of mental abilities appeared in the accuracy of the performance of the stabbing movement.

Recommendations

In the light of the results reached by the researcher, he makes the following recommendations. The need to pay attention to mental abilities in the sports field in general and in fencing in particular, with the development of a special training curriculum for the development of abilities. Conduct more studies that deal with the impact of mental abilities in other sports and on different samples. Conduct further studies on the contribution rate of mental abilities of different variables to the level of physical performance and skills in fencing.

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Conflict of Interest

We declare that this article we wrote is not involved in any conflict of interest.

Ethics Committee

This study was performed by adhering to the Helsinki Declaration. Ethical approval of the study was obtained from University of Baghdad, Iraq Ethics Committee at the board meeting dated 15.01.2024 and numbered No:1

Authors Contribution

Study Design, AMG and NHA; Data Collection, NHA and AMG; Statistical Analysis, NHA and AMG; Data Interpretation AMG and NHA Manuscript Preparation, NHA and AMG; Literature Search, AMG and NHA. All authors have read and agreed to the published version of the manuscript.

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Appendix No. (1)

Mr. .....

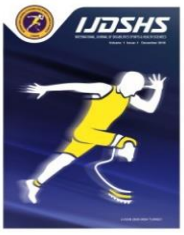
Greetings, the researcher conducts his research tagged (ratios of the contribution of some mental abilities in the accuracy of the performance of the stabbing movement with the Epee weapon) on the female team of the College of Physical Education and Sports Sciences / Muthanna University for fencing, and given your experience and scientific know-how, the researcher requests you to thank you for assisting with the nomination of the most important mental abilities through your experience in this field.

With appreciation

Note:-

When nominating the mental abilities that you deem necessary, please put a score ranging between (zero - 5) in the designated box, noting that the lowest score is (zero) and the highest score is (5) degrees with an estimate:

Mental abilities	Grade according to importance						Notes
	0	1	2	3	4	5	
Attention							
intelligence							
thinking							
stability attention							
concentration attention							
sensory motor perception							
conversion attention							



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RESEARCH ARTICLE

How Precision, Strength and Flexibility Affect Badminton Skills

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Abstract
The importance of the research lies in developing flexibility exercises (positive and negative) that help improve the level of physical and skill performance, address some weak points, and develop factors that work to implement skills with a wider range of motion, accuracy, and high strength. Performing (dimensions) strokes And the forward projection) by not using the wrist and the correct movement of the striking arm. This makes the player's performance ineffective, which requires her to practice flexibility and movement flow to address this weakness. The study aims to prepare exercises using flexibility (positive and negative) and to know the effect of flexibility exercises on some physical characteristics, accuracy and power of strikes (dimensions and forward projectio)،The researchers experimental method by designing two equal groups and on a sample of (10) female players. As for the field study procedures, flexibility exercises were carried out over a period of (10) weeks and two units per week. The researchers concluded that Flexibility exercises developed some physical characteristics and the accuracy and power of strokes, the data was analyzed using the spss version 26 application. The results showed that (2) concentration has a significant impact on badminton skills ,with asignification mark of Push up test in 15 sec 2.01<0.00, Trunk flexion test from prone position2.07<0.00, Lateral step test (10 seconds1.09<0.00, Overhead defensive clear test2,17<0.00, drop shot test1.99<0.00, were more developed. Researchers recommend emphasizing the use of flexibility exercises, especially for strokes (dimensions and forward projection) and the rest of the badminton skills.

Keywords
Positive And Negative Flexibility Exercises, Dimensions And Projection

INTRODUCTION

Sports have developed significantly in recent years, and this did not come from nothing, but rather came through following modern scientific foundations and methods for scientific research, In game badminton success Achievement is largely determined by playing skills. A player's ability in a match or competition is determined by four factors: physical, technical, tactical, and mental conditions as the developed countries in this field have left no means unturned in order to advance the sporting level and obtain achievement in all individual and team sports games. Badminton is considered one of the very popular individual games in most countries of the world as it requires high physical, skill and motor abilities to participate positively. The findings provide practical implications for the training and development of badminton players, emphasizing the importance of including exercises specifically designed to improve concentration, eye coordination and agility. With a better understanding of these factorsm (Donie et al., 2023).

It has a prominent and effective role in raising the sporting level, especially in this game as it is characterized by the presence of difficult and open-ended skills to perform, so it must be emphasized. These skills require regular practice to develop effective and efficient movements (Halim et al., 2023). Good playing skills are

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essential for a successful badminton game (Azhari et al., 2022). ‹ By developing the skill, it is possible to raise the level of the player's performance as it is a distinguished performance. Among the basic skills in the game of badminton are the striking skills (dimensions and forward projection), as these skills are considered among the difficult skills as they are open to performance and the foundation and cornerstone of the game, so they must be developed and mastered by all scientific methods and means , need understood that concentration in study this also give influence to Skills badminton . Statement this also strengthened by study (Halim et al., 2023).

As the development of each skill in any game or sport to some extent comes by raising the level of physical abilities, and one of the important elements that must be emphasized is flexibility, The ability to perform lob strokes correlated with both physical elements, namely arm muscle explosive power and waist flexibility, so badminton coaches can optimize both physical components if they want to improve their athletes' lob-hitting abilities (Khaeroni et al., 2022). Training models using mediabased methods have also proven effective in badminton training. Proven with training models media- based can become possible methods applied in training badminton during the performance of these two skills because it requires swinging in the same direction or opposite direction and rotation in all parts of the body, that help improve the level of physical and skill performance, address some weak points, and develop factors that work to implement skills with a wider range of motion, accuracy, the study of (Al-Selmi et al., 2019) showed that method internal imagery mental exercises can increase backhand serve _ short , results This showing more influence good compared to with external imagery mental ,and high strength, and this is what makes the game of badminton more developed and successful.

The problem of research

Any weakness in physical fitness and motor abilities affects the performance of skills in general, and this is what the researchers noticed while monitoring the technical level of the female players. The researchers found that the performance of the two strikes (the push and the front drop) was not effective, and this prompted the researcher to study the reason for this weakness through swinging the striking arm, whether The strike was in the same or opposite direction, and the range of motion with which he struck the ball was narrow, making his performance inaccurate or weakening its strength, making it easily returned by the opponent. Therefore, the researchers decided to study this problem to contribute to developing appropriate solutions that address the causes of this weakness when implementing what is under study through Establishing positive and negative flexibility exercises can help develop striking skills (dimensions and forward projection) and raise their overall level to reach the best results in this game.

The Research Objective

Preparing exercises (positive and negative flexibility).

Identifying the effect of (positive flexibility) exercises on the accuracy and strength of strokes (dimensions and forward projection) for badminton players.

Identifying the effect of (passive flexibility) exercises on the accuracy and strength of strokes (dimensions and forward projection) for badminton players.

Identifying which exercises have the greatest impact (positive or negative) on some physical characteristics, accuracy and strength of the distance strikes and forward projection of badminton players.

The Research Hypothesis

There are statistically significant differences for positive flexibility exercises between the pre- and post-tests on some physical characteristics, accuracy and strength of strokes (dimensions and forward projection) for female badminton players.

There are statistically significant differences for passive flexibility exercises between the pre- and post-tests on some physical characteristics, accuracy and strength of strokes (dimensions and forward projection) for female badminton players

MATERIALS AND METHODS

The most important thing that distinguishes specific scientific activity is the use of the experimental method (Jawad, 2004) and the nature of the problem concerned with the study obliges the researchers to choose the method, so the researchers used the experimental method and the design of two equal groups to suit the nature of the research and its problem.

This article complied with ethical standards and received approval by the department ethics committee, scientific affairs , university of Baghdad, college of physical education and sport sciences for women under the reference number (SA2-2024-15/1). The participant gave informed consent along with the volunteer form covering study details, risks, benefits, confidentiality, and participant rights. The study prioritized the rights and welfare of the participant in the design, procedures, and confidentiality measures, strictly adhering to the ethical principles of the Declaration of Helsinki.

The research population was chosen intentionally, namely the national badminton team players, who numbered (10) players, with a percentage of (100%). The research sample included all members of the original community, with the same percentage. They were divided into two equal groups by a random method (lottery). The first group used positive flexibility. The second is negative.

Research tools and means of collecting information

Research tools, a legal badminton court with its accessories, 10 rackets, 5 volleyball tubes, a metric tape measure, a rope 20 meters long, a colored measuring tape, means of collecting information, Arab and foreign sources, a form recording grades, testing and measurement..

Tests used

Physical tests

First: Forward support test (bending and extending the arms for 15 seconds) (Fattah,1997)

Second: Testing the trunk bending backwards from prone (Jawad, 2004)

Third: Side step test (10 seconds) (Ali Salloum Jawad, 2004)

Skill tests

First: Test the front dimensions (Shaghati, 2011)

Second: Forehand Drop Test (Shaghati, 2011).

The exploratory experiment: The researchers conducted the exploratory experiment, which is practical training for the researcher to identify the negatives and positives that he encounters while conducting the tests, on January 2, 2023, at ten in the morning, on two players from the same research sample. The aim of it was to identify the time and avoid errors, if any, and the extent of their suitability for the sample members And the understanding of the assistant staff Field study procedures.

Pretest

The pre-test for the accuracy and strength of the blows (dimensions and forward projection) was conducted for the research sample on 1/8/2023 at ten in the morning in the hall of the Al-Athuri Club. All supplies for the test and the assistant work team were prepared. How to perform the test, the number of attempts, the flow of work, and calculating grades and recording them in an evaluation form were presented and explained.

Main procedures

The researchers chose flexibility exercises (positive and negative) (Appendix 1) from the sources and references in order to reach the highest level of flexibility to give the joint and muscle the full range of correct movement and gain strength, speed, and fluidity of the motor path to reach the best performance with accuracy and strength of strikes (dimensions and forward projection). is under study, and was implemented over a period of (10) weeks, at a rate of two units per week, i.e. twenty units for the curriculum as a whole, and with a time of approximately (60) minutes per unit, as the number of repetitions of each exercise is from 3 to 6 repetitions, and the duration of stability in the exercise is from 3 to 60. second . The sample was trained by the trainer and the assistant work team.

Posttest:

The post-test was conducted after the completion of the implementation of the positive and negative flexibility exercises curriculum by the assistant work team on 3/6/5/2023 AD, at ten in the morning, on the same field and under similar conditions for the two groups, and with all special supplies prepared as in the pre-test present, analyze and discuss 3-the results:

Presentation of the results of the pre- and post-test and the percentage of development for the positive flexibility group on the accuracy and strength of strokes (dimensions and forward projection).

Table 1. 10 Week : Some positive and negative flexibility exercises

Week1	Stretch your arms*: Stand up straight, extend your arms out to the sides, and gently reach for the opposite side, holding for 15-30 seconds on each side.
Week2	Neck stretches*: Slowly tilt your head from side to side, bringing your ear toward your shoulder. Hold for a few seconds on each side.
Week3	Shoulder rolls*: Roll your shoulders forward and backward in a circular motion for 30 seconds.
Week4	Leg stretches*: Sit on the floor with your legs straight, then reach for your toes and hold for 15-30 seconds. Repeat a few times.
Week5	Calf stretches*: Stand facing a wall, place one foot behind you, and press the heel into the ground while keeping the back leg straight. Hold for 15-30 seconds and switch legs.
Week6	Back stretches*: Sit on the floor with your legs crossed and gently twist your torso to one side, holding for 15-30 seconds. Repeat on the other side.
Week7	Hip flexor stretch*: Kneel on one knee, while the other leg is bent at a 90-degree angle in front of you. Gently push your hips forward, feeling the stretch in your hip flexors. Hold for 15-30 seconds on each side.
Week8	Child's pose*: Start on your hands and knees, then sit back onto your heels, reaching your arms forward and lowering your forehead to the ground. Hold for 30 seconds.
Week9	Cat-Cow stretch*: Start on your hands and knees, arch your back upward (like a cat), then drop your belly and lift your head (like a cow). Repeat this flow for 30 seconds.
Week10	10-Quad stretch*: Stand on one leg, grab your opposite ankle, and gently pull it toward your gluteus. Hold for 15-30 seconds on each leg..

Table 2. It shows the arithmetic mean, standard deviation, and Wilcoxon values calculated for the pre- and post-tests and for the positive flexibility group

The tests	Measuring unit	**Pretest**		**Posttest**		Wilcoxon value	SIG	Level of significance
		X	SD	X	SD			
Push up test in 15sec	sec	9.8	0.73	13.8	1.20	2.09	0.00	moral
Trunk flexion test from prone position	cm	20	1.21	23.2	1.01	2.01	0.04	moral
Lateral step test 10) seconds	sec	3.7	0.32	4.4	0.44	2.91	0.04	moral
Overhead defensive clear test	degree	25.6	8	30.2	8.7	2.20	0.02	moral
drop shot test	degree	12.31	2.21	18.6	1.02	2.16	2.02	moral

Arithmetic Mean (X), Standard Deviation (SD)

Statistical analysis

The statistical analysis was carried out manually and with SPSS version 14.0 for Window of the statistics programme. The acquired data was statistically evaluated using descriptive statistics like mean, and standard deviation, p value calculation of direction Also, the descriptive statistics was used as, tables. The threshold for statistical significanc.

RESULTS

Table 3. It shows the arithmetic mean, standard deviation, and Wilcoxon values calculated for the pre- and post-tests and for the negative flexibility group

The tests	Measuring unit	**Pretest**		**Posttest**		**P V**alue	SIG	Significance level
		X	SD	X	SD			
Push up test in 15 sec	sec	9.8	0.73	13.8	1.20	2.01	0.03	moral
Trunk flexion test from prone position	cm	20	1.21	23.2	1.01	2.00	0.04	moral
Lateral step test (10 seconds	sec	3.7	0.32	4.4	0.44	2.03	0.04	moral
Overhead defensive clear test	degree	25.6	8	30.2	8.7	2.03	0.04	moral
drop shot test	degree	12.31	2.21	18.6	1.02	2.21	0.02	moral

Arithmetic Mean (X), Standard Deviation (SD)

Table 4. It shows the arithmetic mean, standard deviation, and Mann and Whitney values calculated for the pre- and post-tests and for the positive and negative flexibility group

The tests	Measuring unit	Positive flexibility		**Negative Flexibility**		Calculated **P** value	SIG	Level of significance
		X	SD	X	SD			
Push up test in 15 sec	sec	0.73	17.8	1.20	13.8	2.01	0.00	moral
Trunk flexion test from prone position	cm	1.22	25.15	1.01	23.2	2.07	0.00	moral
Lateral step test (10 seconds	sec	0.33	6.3	0.44	4.4	1.09	0.00	moral
Overhead defensive clear test	degree	2.19	41.7	8.7	30.2	2.17	0.00	moral
drop shot test	degree	1.53	18.6	1.02	18.6	1.99	0.00	moral

Arithmetic Mean (X), Standard Deviation (SD)

DISCUSSION

From Table (2.3), it is clear that there are statistically significant differences in the accuracy and strength of the dimensional and forward strikes between the pre- and post-tests, and in favor of the post-tests in positive and negative flexibility. The researchers attribute the reason for this to the nature of the exercises that were practiced during the training units, which makes it of interest to the national female team players focus on positive and negative flexibility, especially positive flexibility during training, as it is considered to have an effective role in some sports games and events, and the performance of some movements depends on it. It helps with simplicity, flow, and compatibility in motor performance. The widening of the range of motion in the joints of the body also provides the opportunity for the muscles to work in... The appropriate length of the contraction then allows the production of greater force" . Flexibility is often mentioned when we determine physical fitness. Low flexibility in an individual is considered the first influence and sign of a low level of physical fitness (Abu Al-Ala, 1997) confirms, "The tightness of the work on the joints leads to an impediment to the athlete's level of strength, speed, and coordination" Fakher (2011) believes that "flexibility increases the effective range of motion for using force in some sporting activities such as golf and tennis" . The researcher believes that the rate of development in positive flexibility is greater than negative flexibility. This

is the assistance, that is, wrong forced stretching, and this is what was confirmed by Abdullah (2005). The stretching must be done correctly so that it is not painful because pain is an indicator of the presence of something wrong, and do not over-stretch your joints because This will put effort on her ligaments, and the stretching is within your own capabilities and not compared to what others can do.

As for Table (4), it shows that there are significant, statistically significant differences between the post-tests of positive and negative flexibility, which the researchers attribute to the fact that flexibility is not an inherited trait, but rather an acquired characteristic, so it requires continuous, uninterrupted training, and this is what was confirmed by (Jage 1982): "It is advisable for the athlete to continue to practice Flexibility exercises even after obtaining the highest levels because it is an acquired characteristic rather than inherited, and when stopping training for a certain period leads to its loss" (Al-A'aidhi 2011) states, "Flexibility is considered the finest performance of various sports movements" . She indicated (Abeer',2008) "Variable resistances have a positive role in developing some physical and functional variables for badminton players" As a study by Abeer et al., (2019) showed The research results: (using the exercises and some of the dietary supplements have positive effect on improving some of the physical abilities, speed and accuracy of smash shot skill for badminton young players)." . "and a study of (Abeer et al.,2019) confirmed, Recommend the researchers: to circulate the results of the current study on the sports teams participating in the league in badminton."and a study of (Hayder et al.,2021) indicated " Transactional Theories, and Transformational Theories). where these theories considered the most popular and common in the field of leader and will be discussed by this work " The study (Mazen et al.,2021) confirmed, "The study recommended that providing the necessary technological devices and tools for work in colleges of physical education and sports" .

The study of (Mazen et al.2022) indicated The results were shown that the percentage of improvement in the skill performance of Mai Geri is 100% (7:17) "The study (Al-Hijazi, & Dakhil, 2021) indicated (it is necessary that the equipment, tools, and type of exercises be compatible with the requirements of the sample to achieve the desired goal and objective) (31:18)

The study of (Mohsin & Al-Selmi,2 022) indicated the necessity of continuing to engage in aerobic and anaerobic sports activities for women with ovarian syndrome because they have an important role in improving the functioning of functional organs, including regulating the function of building hormones".

The study of (Abeer et al., 2022) indicated that HIIT exercises has a positive effect on some physiological and physical indicators in reducing competition anxiety and it had the role to develop the offense skills for the players of Badminton ".

The study of (Nassir & Dakhil, 2022) emphasized "emphasizing the application of various training programs" . The study of (An'am et al., 2020) recommended "adopting the training curriculum on the flat hierarchical method in developing strength, as well as emphasizing the use of weight exercises in training programs" . Study also express so that you can reach maximum performance in game badminton skills very required , by Because that every athlete or player must own skills base game badminton (Al-Selmi et al., 2019). Where method internal imagery mental exercises can increase backhand serve _ short , results This showing more influence good compared to with external imagery mental (Manurung & Dimyati, 2019). Furthermore exercise strength and flexibility combined with session training skills give enhancement skills badminton, where are the results this also showing more good compared to control (Beniwal & Dhauta, 2023). Proof the strengthen that method planned practice will give good impact against enhancement skills badminton, so matter This can become points important in game .

Conclusion

Positive and negative flexibility exercises contributed to the development of some physical characteristics. Positive and negative flexibility exercises contribute to developing the accuracy and strength of dimensional and forward strikes. Positive flexibility exercises are more effective than negative flexibility exercises in terms of accuracy and strength for the accuracy and strength of dimensional and forward strikes

The recommendations

Emphasizing flexibility to develop sports performance for all individual and team sport Using flexibility exercises in training and

educational units for badminton and other games. Using all types of flexibility in all motor skills in badminton and other games.

Conflict of Interest

We confirm that all tables and figures in this article are ours and written by the researchers themselves.

Ethics Committee

This article complied with ethical standards and received approval by the department ethics committee, scientific affairs , university of Baghdad, college of physical education and sport sciences for women under the reference number (SA2-2024-15/1).

Author Contributions

Study Design, ADHA and SHA; Data Collection, ADHA, SHA, NRH, ZA; Statistical Analysis, ADHA, ZA; Data Interpretation, ADHA, SHA, NRH, ZA; Manuscript Preparation, ADHA, SHA, NRH, ZA; Literature Search, ADHA, SHA, NRH, ZA. All authors have read and agreed to the published version of the manuscript.

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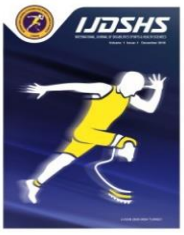

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RESEARCH ARTICLE

Cognitive Regulation and Its Influence on the Performance of Volleyball Serve Skil

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Abstract
This study aims to identify the level of cognitive regulation and the level of serve skill performance among female students, and to identify the relationship, contribution and impact of cognitive regulation to the performance of their serve skill. This descriptive correlational study targeted sophomores at the College of Physical Education and Sports Sciences for Girls/University of Baghdad. The study included a purposive sample of (32)، . Participants' opinions were surveyed using the cognitive regulation scale in volleyball for female students then skillfully testing then using the performance of serve skill considering their accomplishment of learning performing such a skill in their academic courses. Data were analyzed using the statistical package for social science (SPSS) to be the conclusions and recommendations that the level of cognitive regulation among students of the College of Physical Education and Sports Sciences for Girls was acceptable, as well as the performance of their serve skill was acceptable, and that cognitive regulation relates, contributes, and positively affects the performance of serve skill among the study participants. It is necessary to pay attention to mental measurement when teaching the serve skill, especially cognitive regulation owing to its positive role in the performance of this skill. It is also necessary to increase the teachers' experience with the importance of paying attention to improving the level of cognitive regulation of students, as this awareness is reflected in the positives in achieving the goals of improving performance in the physical education lesson for volleyball

Keywords
Cognitive Regulation, Serve Skill , Volleyball

INTRODUCTION

The teaching process is marred by many variables that those responsible persons must exert control over these variables to ensure the achievement of its goals. (Ismail, 2022) believes that teaching process is considered as an essential pillar of the educational process through which the desired changes in the behavior of individuals are made and knowledge, values, habits, and other behavior patterns are acquired. Through this, we can create a conscious generation capable of successfully leading the educational process by raising the role of physical education by employing all possible mechanisms and tools that contribute to achieving the goals of this process, and this is what (Abbas, et al.,2023) see, they emphasizes the pioneering role of sports, which is reflected on public health and on creating a distinctive personality that possesses many successful personal characteristics in society. All these principles are the basis for the teaching process in various sports and activities, especially volleyball and its specificity in the performance of volleyball skills that require collective harmony among students. It must result in a cognitive regulation for each student to rely on herself in the skillful performance after investing that interaction and deriving from it what supports this performance, especially the serve skill, which requires awareness of the various elements of the teaching environment and the material assets

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contained in the volleyball court, "the cognitive movement emerged as a reaction to the behavioral movement that neglected the role of knowledge and cognitive processes in behavior. The cognitive movement sees that the individual is not a negative responder to environmental stimuli rather thinks, interprets, and conducts a lot of mental processes before responding to environmental stimuli. However, they agree with behaviorists about the importance of studying behavior objectively measurable. The cognitive movement agrees with the structural and functional movement on the importance of studying the structure of the mind and thought processes, and it also agrees with the deductive movement in that the perception of the whole differs from the perception of parts. However, what is new to the cognitivists is the study and analysis of the structure of the mind and cognitive processes, which make us perceive stimuli and situations in this way" (Al-Zaq, 2009).

Perception is defined as "a mental process that allows an individual to assimilate and comprehend information around him through his senses and experiences, and it includes a set of mental processes that work together to collect, process, and interpret various information from the environment" (Sternberg & Sternberg, 2016). Also, "perception in general and of all kinds means the way or style of the learner in organizing his reception, assimilation, and comprehension of information as a mental process that occurs within the brain. This mental process relies on the integrity of the senses and the activity of attention and concentration, followed by the process of storage and search in memory to make the decision later" (Goetz & Ash, 2006), this is what the volleyballers need, as Malaz Haider believes that the volleyballers need many capabilities and abilities to make the appropriate decision, even if the match is prolonged, and awareness includes many basic operations, including the following: (Eysenck & Keane, 2015)

1. Sensation: This process allows the body to receive information from the surrounding environment mediated by the senses such as vision, hearing, touch, smell, and taste.
2. Perception: After receiving information from the senses, it is processed and interpreted to form meaning, and this process includes the collection of various information and its transformation into an understandable image.
3. Attention: The ability to focus on specific information from the environment and ignore other information, which helps improve perception and facilitate understanding of important matters.
4. Memory: This process involves the ability to store and retrieve information and past experiences, and memory plays a vital role in shaping our understanding of the world by linking new information with past experiences.
5. Interpretation and Expression: After processing information and converting it into meanings, the individual can interpret those meanings and express them through language, actions, and interactions (Goldstein, 2014).
6. Thinking: This process allows the individual to process information and concepts and reach conclusions and solutions, and includes different types of thinking such as critical, creative, and deductive thinking (Neisser, 2014).

"The process of perception does not take place directly but is governed by mechanisms and principles called the principles of cognitive regulation through which individuals can understand and distinguish things." (Zaghloul & Zaghloul, 2017), as the process of perception is the most important mental process that contributes to the success of the thinking process later. This is confirmed by (Karim, 2022) who believes that the success of the educational process is linked to many important elements, foremost of which is the mental capabilities and abilities of female students. Cognitive regulation "is an important aspect of the perception process that includes the arrangement of the various information we receive from the environment, in order to form an understandable and logical meaning.

Cognitive regulation includes organizing, collecting, classifying, and linking information to each other, and helps in collecting diverse information from the environment and converting it into logical and understandable meanings. This important aspect plays a role in building our understanding of the world, our decision-making, and our interaction with our surroundings." (Reisberg, 2018), and Gregory identified two types of cognitive regulation abilities quoting Tafesh: (Tafesh, 2004)

First

Perception: It is the tool by which information is captured, and these capabilities appear in the form of the following two characteristics:

Abstractness: It is an attribute that enables capturing information and has a concept and mental perception mediated by thinking, and that this attribute enables the individual to record and process what he has of information and special ideas, opinions, concepts, feelings, motives, and experiences, so abstraction attribute allows the individual to understand and realize what is not imagined or perceived for him in form mediated by various senses.

Concreteness: This attribute enables the individual to receive information and record it in the mind by using the senses directly, and this attribute allows the individual to understand what is perceived and felt in the natural world through the different senses.

Second

Organization (Ordering): The organizational capabilities are the means of providing the individual with a way to arrange and organize information and provide it with references, and that organizational capabilities appear in the form of two characteristics:

Sequence: It is an attribute in which the mind is prepared to receive and organize information in a longitudinal, gradual, and systematic order predetermined, so information gathers each other, and its elements are linked, and implemented in the form of a sequential order, and that this attribute enables the individual to arrange the unrelated parts of the information and implement them sequentially and then classify them into categories, and this is the way in which individuals express their experiences and knowledge in an accurate, sequential, logical, and organized manner.

Randomness: It is the way in which the individual prepares his mind to receive information, and then organizes it in a multi-directional way, and randomly the individual can receive a huge amount of information within a fraction of a second, and that the information remains in the mind of the individual subject to his attention and the chances of arousing and using it are usually equal to the individual. Thus, the individual can deal with multiple types of information at the same time. The individual can also express his knowledge and experience in an active, free manner that is not restricted by multiple controls and methods. Thus, the importance and role of perceptual organization for students cannot be disregarded when they continue to attend the physical education class to receive the improvements required to perform various motor skills, considering that perception is the third mental process responsible for skillful learning, and at the same time depends on receiving information from attention, concentration, and interacting with information and matching it in motor memory. Also, considering that perception or cognitive regulation cannot be observed unless it is psychologically measured. However, according to the aforementioned digression, it is necessary for skillful performance in the physical education class. From the scope of the field of work of the researchers in teaching volleyball skills, they noticed the apparent weakness of the students of the College of Physical Education and Sports Sciences in the performance of the serve skill, especially from beginners, to display a weakness in their skillful learning of serve skill, as well as in determining volleyball tracks in specific areas, to be reflected in increasing their effectiveness in the class and then reaching them to achieve those educational goals envisaged from this practical teaching, Thus, the research problem lies in an attempt by the researchers to answer the following questions:

What is the level of the perceptual regulation for the students of the College of Physical Education and Sport Science for Girls?

What is the level of performance of the serve skill for students of the Faculty of Physical Education and Sports Sciences for Girls?

What is the role, contribution, and influence of cognitive regulation on the performance of students of the Faculty of Physical Education and Sports Sciences for Girls?

This study aims to (1) what is the role, contribution, and influence of cognitive regulation on the performance of students of the Faculty of Physical Education and Sports Sciences for Girls? (2) Identifying the level of performance of the serve skill among students of the Faculty of Physical Education and Sports Sciences for Girls, and (3) identify the relationship, contribution, and influence of cognitive regulation on the performance of serve skill among students at the College of Physical Education and Sports Sciences for Girls.

MATERIALS AND METHODS

According to the researchers mentioned in the problem of the current research, the descriptive research method was employed in the method of correlational relations, which is defined as "the study of the relationship between two variables or many variables as they are available as a phenomenon in a particular research population" (Abdel Fattah, 2022).

Sample and Sampling

The target population to be studied in this study is determined by the sophomores at the College of Physical Education and Sports Sciences for Girls / University of Baghdad who continue in the morning attendance for the academic year (2022-2023), whose total number is (71) students distributed by nature into two classes, of whom (32) students were purposively selected for the research sample by (45.07%) as they are the community of the current research problem, then they were treated as one total sample, and the rest of them were selected for the pilot study of (6) students representing (8.451%) of their original community.

This article's necessary ethics committee permissions were obtained with College of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq. Social Sciences Ethics Committee Commission Date: 18.01.2024 Issue/Decision No: 11. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki , and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

Measures and Procedures

The researchers used the cognitive regulation scale in volleyball for female students (Dunia, 2023), which is a measure that enjoys all scientific foundations and transactions and has not been built on the students of the College of Physical Education and Sports Sciences for Girls in Iraq for more than (6) months, and its details are displayed in Table (1):

Table 1. The structure of the cognitive regulation scale in volleyball for female students in its form as reported from its source

	Dimensions	No. of items	Alternatives	Correction key	Range	Average
1	Visual fullness	6	Apply to me always	5	6-30	18
2	Auditory discrimination	8	Apply to me often	4	8-40	24
3	Visual completeness	6	Apply to me sometimes	3	6-30	18
4	Sequencing and audio linkage	8	Apply to me rarely	2	8-40	24
5	Visual Communication	7	Do not apply	1	7-35	21
	Total	35	5		35-175	105

Also, based on specificity of the current research, the validity of the scale was verified by presenting it to (19) experts to verify the face and logical validity of the paragraphs by adopting more than (80%) or more of their agreement on them. Considering that the dimensions, items, their alternatives, the key to correcting them, and the instructions of the scale have not been modified, and no items have been deleted or merged or added to them, the researchers statistically verified the reliability by processing the degrees of its application to the pilot sample of (6) students, as the result of the (Horst) coefficient (0.977) at the level of significance (0.05) and the degree of freedom (4) as the degree of (Sig)< (0.05). Thus, the image of the scale was adopted as it is without any change to it as shown in Appendix (1), and the test of Hassanein (2001, 247) was adopted, in this test the student's performance in the three attempts is evaluated by three experts. The distribution of the grade shall be as follows: the preparatory section: its grade (3), the main section: its grade

(5), the final section: its grade (2), as shown in Appendix (2). The scientific foundations and coefficients of this test were verified, and the face validity coefficient was (89.474%), and the objectivity coefficient was (0.944) and reliability by repetition (0.917) at the level of significance (0.05) and the degree of freedom (4), as the score was (Sig)< (0.05). Thereafter, the application main sample was surveyed (n = 32 female students) that was started using the Cognitive Regulation Scale in volleyball for female students, and then they were skillfully tested by the performance test of the serve skill at the College of Physical Education and Sports Sciences/ University of Baghdad for the period from May 5th, 2023 to May 31st, 2023 considering that they have finished learning to perform this skill in their school stage.

Statistical Analysis

After collecting the scores of each student on the scale and test, they were tabulated and then processed with the statistical package for social science (SPSS) to calculate the values of the percentage, arithmetic mean, standard deviation, independent-sample T-Test, Horst coefficient, simple Person coefficient, one-sample T-Test, and linear regression model.

RESULTS

Table 2. Statistical parameters of the two study variables compared to the hypothetical mean of each of them

Variable	Total degree	Hypothetical mean	X	SD	t	Sig.	P-value
Cognitive regulation in volleyball for female students	175	105	122.5	15.244	6.494	0.000	Significant
Serve skill performance	10	-	7.09	1.957	-	-	-

Significant at $p \leq 0.05$, Degree of freedom = 30, Significance level = 0.05, df = 31, measurement unit = Degree, Arithmetic mean (X), Std. Dev. (SD)

Table 3. Simple correlation coefficient, linear regression, contribution ratio, and standard error of estimation

Influential	Influenced	Simple correlation coefficient R	Linear regression coefficient $(R)^2$	Contribution proportion	Standard error of estimation
Cognitive regulation in volleyball for female students	Serve skill performance	0.947	0.896	0.893	0.641

Table 4. F-Test for investigating quality of linear regression model reconciliation

Influential	Influenced	Variance	Sum of squares	df	Mean square	F	Sig.	P-value
Cognitive regulation in volleyball for female students	Serve skill performance	Regression	106.399	1	106.399	259.1	0.000	Significant
		Errors	12.319	30	0.411			

df: Degree of freedom (df = 30), Sig.: Significance, F is significant at $p \leq 0.05$ at p-value = 0.05

Table 5. Values of constant limit and inclination (influence)

Influential	Variables	β	Standard error	t	Significance	P-value
Serve skill performance	Constant	-7.794	0.932	8.364	0.000	Significant
	Cognitive regulation in volleyball	0.122	0.008	16.097	0.000	Significant

Significance level = 0.05, df = 32, t is significant at p-value ≤ 0.05

DISCUSSION

The regression model displays that cognitive regulation positively relates, contributes, and influences the performance of the serve skill among students at the College of Physical Education and Sports Sciences for Girls. The higher the level of cognitive regulation, the higher the level of performance of the serve skill. The rest of the contribution percentage is attributed to random, unexamined factors. The researchers attribute the emergence of the result of linear regression to the students' possession of cognitive regulation, which exceeded the hypothetical mean of the scale, which helped them to realize the position of the body and feet, as the performance begins with a correct position of the body, the feet are far apart almost shoulder-width, with one foot slightly in front of the other. This helps in achieving a good balance during serve, and thus positively reflected on performance. This level of cognitive regulation helped the proper performance of the position of the hands and the ball, as the ball must be in the student's hand in a comfortable position, with the hands placed from below to support the ball, the fingers must be slightly adjacent to support the ball straight, the you understand that when you prepare to serve, you must point the object forward toward the target you intend to send the ball at. This helps in achieving better serve accuracy. The serve begins by moving the hands back slightly backwards and then going quickly, with the arms and feet used to transfer force to the ball, and the timing in the final touch of the ball is accurate. This finishing touch should be close to the moment when the ball touches the top of the hands. When touching the ball, it must be directed by engaging the wrist and hands to guide it precisely, breathing movements must be proportional to the serve execution, the focus must be on the ball and the target to be aimed, and serve requires strength in the arms and shoulders, so the player must be in good fitness to achieve sufficient strength in the serve. The reflection of cognitive regulation on the performance of the serve skill from below in volleyball depends on coordination among the body, hands, and feet, and accurate timing to obtain an accurate, strong serve. The kick-off time and rhythm of the ball can be used to achieve a more efficient serve, and the serve must be performed at the right moment after the ball has risen slightly. "Cognitive regulation is important in activating innovation, as when diverse ideas and innovative experiences are exchanged, an environment can be created that encourages innovation in the application of volleyball skills and students can be inspired by others' ideas to try new and effective methods." (Capranica et al.,2020), "the practice of mental processes and perception have an impact on growth and development and that this practice does not achieved without training and exercise, which work to attract the learner's mind in order to exercise the skills inherent to him, as his mental development emerges placing him in a rich, stimulating, and sound environment that contains a set of experiences, attitudes, and stimuli appropriate to the age of each learner." (Hamid, 2007). "The role of cognitive regulation of knowledge exchange comes as an important tool in achieving the continuous development and improvement of the learners' performance. This role includes managing and organizing the conveying knowledge and valuable experiences among them, whether they are learners or teachers" (Ribeiro et al., 2021).

Mental training requires allocating time to acquire mental skills in the light of daily exercises and determined times per week, if the learner decides to develop and control the mental aspect, as happens in the physical aspect, and work in a serious way in order to save the necessary time" (Chamoun, 2017). Also, "the cognitive regulation is important in investing the previous experiences through the exchange of experiences and advices, the team can benefit from previous experiences to avoid mistakes and continue to improve the skillful performance in volleyball." (Ribeiro et al., 2021). This is consistent with (Maysam, 2023) who indicates that learning would be more effective as a result of building new learning by relying on the learner's previous knowledge and experiences and linking them with new information. Bandura sees; as mentioned by Rajih, that "Individuals have the ability to influence their behavior and their environment, using cognitive processes, that is, when a person arranges the situational environmental variables, and creates cognitive foundations to produce the desired effects that can be derived from the variables, he exercises the attribute of self-control." Therefore, the energy, capacity, means, methods or strategies that enable us to continuously and successfully interact with

the environment" (Barakat, 2012). "Cognitive regulation of knowledge exchange leads to enhancing communication and collaboration among team members, shared knowledge can bring together different team members and increase their integration" (Crotty & Abrahams, 2018). "The ability of visual and sensory perception is one of the most important mental processes that play a role in giving meaning to our sense of different sports movements and is an important part of the information processing system, i.e., analyzing and understanding sensory information coming from the surrounding environment" (Naif, 2004). Individuals also differ in learning abilities and how to deal with, retain, and organize information in the situations facing each of them. One of the manifestations of individual differences among individuals is their difference in their mental characteristics, which are considered the active component of memory and responsible for processing information (Sakr, 2021). The cognitive regulation of knowledge exchange displays an important role in enhancing the skillful learning of volleyballers, by exchanging experiences and directing advice, as the focus must be on continuous learning and adaptation to new knowledge and experiences, and the team can benefit from continuous changes and improvements in performance" (Araújo & Davids, 2016). Since understanding and assimilating the environment in which we live is important and a distinct ability, this cognitive process of the world we live in is not without complexities" (Hassan 2017). As (Roaa Abdul Amir Abbas et al., 2019) believe that understanding these complexities requires the creation of new management systems and unconventional methods that fit with environmental variables and developments and are dealt with in a wonderful way. Also, "cognitive regulation can help guide learners toward reliable sources of knowledge, as cognitive regulation of knowledge exchange plays an important role in learning skillful performance in volleyball, by directing discussion, stimulating participation, and providing support. Continuous improvement in performance can be achieved. This role contributes to building an educational culture based on cooperation and knowledge sharing" (Launder & Piltz, 2015). The active mental perception of the performance of certain skills results in an activity of the muscles working in that skill, and may be limited, but its usefulness is evident in strengthening the pathways of nerve signals sent from the nervous system to those muscles, as well as the mental perception helps the student in achieving more knowledge (Tamimi, 2018).

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Conflict of Interest:

There is no personal or financial conflict of interest within the scope of the study.

Ethics Committee

Board Name: College of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq. Social Sciences Ethics Committee Commission Date: 18.01.2024 Issue/Decision No: 11.

Author Contributions

Study Design: DA, NA; Data Collection: DA, NA; Statistical Analysis: DA; Data Interpretation: DA, NA; Manuscript Preparation: DA, NA; Literature Search: DA, NA. All authors have read and agreed to the published version of the manuscript.

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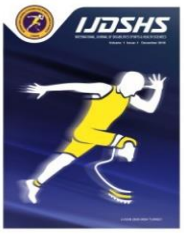

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RESEARCH ARTICLE

Effect of Nutritional Supplement Accompanying Functional Strength Exercises on the Special Physical Abilities and the Spiking Skill of Volleyball Players

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Abstract

The process of preparing players and developing their level is of great importance, and it is a comprehensive process that goes beyond the reservoirs of sports training in isolation, but rather seeks to strengthen it with supporting elements, including nutritional supplements. In performing advanced skills in volleyball, including the skill of spiking, as well as weakness in special physical abilities. The research aims to: prepare a training program for functional strength that fits the capabilities of the research sample, determine doses of nutritional supplements commensurate with the mass of the players, and identify the effect of the training program for functional strength accompanying nutritional supplements on special physical abilities and the performance of the skill of spiking volleyball.The researchers used the experimental method (designed by the two experimental groups), the first experimental group practiced functional strength exercises with doses of nutritional supplements, and the second group practiced functional strength exercises in isolation from nutritional supplements. The research sample was selected from the specialized school volleyball players. The functional strength-training program was implemented; the researchers concluded the success of the functional strength training program in developing the special physical abilities of volleyball players and the development of the skill of spiking, need for (8) weeks, at a rate of (3) units per week, and a rate of (24) training units.

Keywords
Nutritionalsupplements, Functional Strength, Special Physical Abilities, Spiking Skill, Volleyball

INTRODUCTION

The method of functional strength training is one of the modern methods in the field of sports training, through which it is possible to rely on the movement and stability of the muscles in the center of the body, which therefore results in a development in muscular strength, balance and endurance, as it depends on the equal work between the upper limb of the body depending on the form of performance The kinetic or technical skill, and thus shortens a lot of effort and time for trainers to develop more than one ability or achieve more than one aim in one (Ghaidan, 2024). Spiking s one of the most important skill capabilities that determine the level of the team during the competitions, as the coaches seek to find ways to develop the spiking in volleyball (Kitamura, et al. ,2020).

The importance of the research lies in the use of functional strength exercises in training programs with allocating doses of nutritional supplements to develop the physical abilities of the

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players and perform the spiking (Mustafa, et al. 2022) .

Achieving achievement in the field of sports requires concerted efforts to develop sports training and the elements supporting it, and that staying on traditional methods is no longer useful. Through the modest experience of the researchers and their follow-up to the level of local clubs and their comparison with the advanced global levels, they noticed a weakness in the level of performance of the main skills, especially the implementation of the skill of spiking volleyball, accompanied by weakness in some physical abilities related to the performance of game skills. By informing them of the latest training methods and the sciences related to it, they set out to develop functional strength exercises, which are concerned with developing muscle groups according to the performance nature of skills and allocating doses of nutritional supplements accompanying the training curriculum in a serious attempt to develop special physical abilities and the skill of spiking.

Objectives

Preparing a functional strength training program that matches the capabilities of the research sample. Determining doses of nutritional supplements according to the mass of the players from the research sample. Identifying the effect of the training program accompanying nutritional supplements on the special physical abilities and the skill of spiking in volleyball for the research sample

Hypothesis

There are statistically significant differences between the results of the pre and post-tests for the two experimental groups in the special physical abilities and the skill of spiking) in volleyball. There are statistically significant differences between the results of the post-tests between the two experimental groups in the special physical abilities and the skill of spiking in volleyball.

Delimitations

The study was limited to only Novice volleyball Players, who are learning the game of volleyball, the researcher conducted field experience, which is the.

Preparing a functional strength training program that matches the capabilities of the research sample. Determining doses of nutritional supplements according to the mass of the players from the research sample. Identifying the effect of the training program accompanying dietary supplements on the particular physical abilities and the skill of spiking in volleyball for the research sample.

Limitations

The things concerned with climate conditions, health habits, and other psychological variables are beyond the control of the investigator. The researcher takes a sample of his research of the players who are in schools and their number was (24). sponsor by sporting specialization handball of all ages, especially the research sample at the age (of 16-17 years).

That the application of the tests will be with the help of some of the utilities that will enter by the researcher during the application of experience to give the experience a more realistic test during the performance of the selected sample of research, These schools are spread over Iraqi governorates, and which will form the society's original research sample. The researchers chose the Volleyball Specialized School – Baghdad – Iraq, for the period from (9/1/2022) to (1/4/2023).

MATERIALS AND METHODS

Research Methodology:

The researchers used the experimental method because it fits with the nature of the research, based on the design of the two experimental groups

This article's necessary ethics committee permissions were obtained with University of Baghdad Faculty of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 25.12.2023 Issue/Decision No: 2023/14. The writing of this article has gone through all ethical procedures related to the academic realm. All the principles of the Declaration of Helsinki were complied, with special emphasis on informed consent and the vulnerability of the study population.

Sample

The research sample was chosen intentionally, and it represented the players of the Specialized Volleyball School for the season (2022-2023), and their number was (24). To avoid influences that may affect the desired results of the research, the researchers proceeded to extract the homogeneity of the research sample in the variables (age, training age, mass, length) using the torsion coefficient, and all values appeared

between (3 ±), the sample was randomly divided into two groups The first group applies the training curriculum for functional strength exercises, and the second group applies the training curriculum for functional strength exercises with taking doses of nutritional supplements. Equivalence was made in the variables studied between the two groups.

The following tests were approved;

A medical ball throwing test weighing (3) kg with both hands from a sitting position on a chair to measure the explosive power of the muscles of the arms (Abdel-Fattah and Hassanein,1997).

Vertical jump test from stability to measure the explosive power of the legs (Hassanein and Abdel Moneim , 1997) .

Forward leaning test (bending the arms and extending them on the ground for (10) seconds) to measure the speed characteristic of the upper extremities (Muhammad ,1990)

Volleyball spiking test.

The scientific conditions of the tests were verified, and the exploratory experiment was conducted on, 23/9/2022, and then the pre-tests were carried out in the indoor hall of the Specialized Volleyball School in Baghdad, 1/11/2022. The conditions related to the implementation of the tests were proven by stabilizing the temperature and the amount of illumination

Training program (experimental Factor)

According to the results of the pre-test for the research sample, the researchers intended to build a training program for functional strength with the use of nutritional supplements, and exercises were used within the main section aimed at developing some physical abilities and spiking youth in volleyball.

The application of the training curriculum began (8/11/2022) and ended (9/1/2023). The functional strength training program was applied to the first experimental group

The training program included the following

The training curriculum was built for a period of (8) weeks with (3) training units per week for;

Days (Sunday - Tuesday - Thursday) so that the total number of training units is (24) training units in the special preparation stage for the players

The duration of the training unit ranged from (45) minutes, the main part of which is (16) minutes, and according to the principle of gradation in the load, the total time of the training curriculum was (867) minutes.

The principle of individual differences has been taken into consideration as it is a primary factor in training to develop the components of the training load.

The method of progressive training (period) was used in applying the curriculum within the main section.

The researchers used the ratio (work to rest) between one exercise and another, rest between groups, and the total work time (1:1) - (1:2) - (1:3).

The training methods used in the training curriculum varied, especially in strength and balance training and other tools.

Because of the research sample and the aim of the research, the appropriate intensity was determined and graded with it from low to sub-maximal intensity, with intensity ranging between (90%-60%) of the maximum intensity of the player, except for the first week, all units were in intensity,(60%), was to implement the first phase of functional strength training, and the first week aimed at accustoming the player to the exercises used to avoid injuries during a performance.

Relying on the exercises that were used in the training units of the modern exercises to develop the special fitness of volleyball players and related to their skill performance.

The researchers legalized the nutritional supplement doses taken by the players in the second experimental group, and the nutritional supplement was used (Creiten Powder) (American origin), with (Syntha 6 isolate) whey (American origin), and the supplement dose was determined on According to the athlete's body mass, the overall average was as follows:

One tablespoon of whey (45 minutes before exercise). One cup of creatine powder (30 minutes) before exercise. The post-test was conducted on (12/1/2022), under the same conditions as the pre- test.

Statistical Analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Presentation, analyze, and discussion of the results of (pre - post-tests) of special physical abilities and the skill of spiking for the first and second experimental groups

Table 1. shows the results of (pre - post-tests) of special physical abilities and the skill of spiking for the first and second experimental groups

Statistical processors / Variables	measuring unit	Groups	Pre-tests		Post-tests		median difference	skew difference	Valuecalculated (T)	Sig error rate	significance of the differences
			Mean	Standard Deviation	Mean	Standard Deviation					
Test explosive strength of the legs	cm	Group1	25.400	5.358	30.200	5.072	-4.800	1.316	-11.529	0.000	sig
		Group2	24.400	3.657	33.600	4.005	-9.200	2.859	-10.173	0.000	sig
Test Arms explosive strength	M	Group1	2.935	0.689	4.011	0.322	-1.076	0.633	-5.370	0.000	sig
		Group2	2.950	0.655	4.977	0.314	-2.072	0.688	-9.308	0.000	sig
Test speed distinctive of the arms	No./s	Group1	7.900	1.197	11.200	1.505	-7.700	1.567	-15.539	0.000	sig
		Group2	7.500	1.178	19.300	2.406	-11.800	2.573	-14.500	0.000	sig
Test spiking skill	Degree	Group1	12.100	2.079	22.500	4.725	-10.400	3.533	-9.306	0.000	sig
		Group2	12.800	3.119	31.400	3.405	-18.600	4.926	-11.940	0.000	sig

*P <0.05

Through Table (1), it becomes clear to us that there are significant differences between the results of all (pre- and post-tests) for the first and second experimental groups - in favor of the post-tests below the level of significance (0.05).

Presentation, analyze, and discussion of the results of the post-tests of special physical abilities and the skill of spiking between the first and second experimental groups

Table 2. shows the results of the post-tests of special physical abilities and the skill of spiking beating between the first and second experimental groups

Statistical transactions / Test Name	Measuring Unit	Group1		Group2		Value calculated (T)	Sig error rate	Significance of the differences
		X	SD	X	SD			
Test explosive strength of the legs	CM	30.200	5.072	33.600	4.005	29.856	0.00	sig
Test arms explosive strength	M	4.011	0.322	3.913	0.839	0.345	0.373	non sig
Test speed distinctive of the arms	No./s	11.200	1.505	19.300	2.406	28.652	0.00	sig
Test spiking skill	Degre	22.5	4.725	31.4	3.40	2.073	0.00	sig

*P <0.05, Arithmetic Mean (X), Standard Deviation (SD)

It is clear to us from Table (2) that there are significant differences in the post-tests of the explosive strength tests of the legs, the speed distinctive of the arms, and the skill of spiking Hitting, and in favor of the second group, functional strength exercises and nutritional supplements.

DISCUSSION

According to the results of this research; through Table (1), it becomes clear to us that there are significant differences between the results of all (pre- and post-tests) for the first and second experimental groups - in favor of the post-tests below the level of significance (0.05).

This indicates the positive effect of the training program on special physical abilities for the skill of spiking volleyball, and the researchers attribute this difference to the nature of training for functional strength, which mainly contributed to the strength of the working muscles, which played an important role in enabling the player to perform the skill of the spiking with high efficiency. This is consistent with what went to, "because training according to different conditions of performance achieves the principle of adaptation during the muscular performance to perform skills according to competition conditions, which is what sports training requires" (Zaid, 2002). Targeting the working muscles and contributing significantly to the performance of skills led to an integration in performance and coordination between the working muscles and the supporting muscles, which had a clear impact on facilitating the implementation of skills, that functional strength training contributed to the production of strength in all its forms, as well as strengthening the muscles that contribute to speed and elasticity. Muscles and tendons lead to the development of flexibility and agility because these exercises contribute to maintaining the body's strength and increasing its balance. Functionality leads to raising the player's ability through the use of weights and dumbbells and integrating the movement of the exercise with the kinetic pattern of skill performance and relying on the strength owned by the player, which gradually develops with functional strength exercises (Hashem, 2013).

This is harmonious with the nature of the research objectives. The first alternative hypothesis adopted by the researchers is verified that there are significant differences between the results of the (pre- post-tests), which indicates the success of the program in achieving its objectives. It is clear to us from Table (2) that there are significant differences in the post-tests of the explosive strength tests of the legs, the speed distinctive of the arms, and the skill of spiking Hitting, and in favor of the second group, functional strength exercises and nutritional supplements. The researchers attribute this to the effectiveness of using nutritional supplements with functional strength exercises, which contributed Effectively to developing the physical abilities and performance of volleyball players The calories of the proteins produced by the nutritional supplements used by researchers contributed to the development of the physical abilities and performance of the players, and this was confirmed by Imad Jassim, who indicated that there are many nutritional supplements for training and competition (energy supplements), these supplements do not exist in nature Rather, they are manufactured in special scientific laboratories. These nutritional supplements contribute to supplying the necessary energy for the player during training and at certain doses determined according to the intensity of training. And agrees with (Musaiger , 1990), who confirmed that the high intensity of training causes intestinal problems... and that carbohydrate drinks and foods consisting of carbohydrates may be useful to compensate for the exerted effort, which indicates their importance to reaching high levels (Al-Zubaidi, 2011).

The explosive strength test of the two arms did not show a significant difference between the two groups, the researchers attribute this to the specificity of the special exercises for functional strength in the curriculum, which emphasized the performance nature of volleyball. The requirements of the sports activity practiced by the player, by developing the explosive strength of the legs and the explosive strength of the arm (Majeed, 2017; Jawad, 2004). The second alternative hypothesis adopted by the researchers is achieved in the tests of the explosive strength of the legs, the speed distinctive of the arms, and the skill of spiking. The alternative hypothesis falls in the test of the explosive strength of the arms and is replaced by the null.

Conclusions

The success of the functional strength training program in developing the special physical abilities of volleyball players. The development of the spiking beating skill in volleyball for both groups as a result of functional strength training. Adaptation of the assigned doses of nutritional supplements to the research sample. The experimental group that took nutritional supplements with functional strength training was

superior to the group whose exercises were limited to functional strength in special physical abilities and the skill of spiking beating in volleyball.

Recommendations

Adopting functional strength exercises in training players because of their importance in developing special physical abilities. The need to follow up on the health and nutritional status of the players through periodic check-ups. The possibility of implementing the functional strength training program with nutritional supplements for other age groups and females. Take into account when giving doses to players of body mass. Do not exaggerate the increase in training intensity for young age groups.

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Conflict of Interest

We declare that this article we wrote is not involved in any conflict of interest.

Ethics Statement

This article's necessary ethics committee permissions were obtained with University of Baghdad Faculty of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 25.12.2023 Issue/Decision No: 2023/14.

Authors Contribution

Study Design, EJH, MA,; Data Collection, MHM, MA, and EJH; Statistical Analysis, EJH, MA, and MHM; Data Interpretation MHM, MA, and EJH Manuscript Preparation, EJH, and MA; Literature Search, MHM, EJH and MA. All authors have read and agreed to the published version of the manuscript.

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RESEARCH ARTICLE

The Contribution Percentage of Some Biomechanical Variables to the First 10 Meters in the Achievement of Men's 100-Meter Sprint

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Abstract
The study aimed to identify the contribution percentage of certain variables to the technical performance of the 100-meter sprint. To achieve this goal, the researcher filmed the runners during the competition period using two motion analysis cameras operating at a speed of 120 frames per second. The research population comprised (45) attempts taken from 9 runners, with (5) attempts for each runner who participated in the second round of the Iraq Clubs Championship in Al-Jadriya on 3/3/2023. The researcher hypothesized that there is variability in the contribution percentages of the biomechanical variables to performance. The researcher identified 12 biomechanical variables after reviewing numerous scientific sources and considering the opinions of experts and specialists in this field. Relevant specific tests were conducted, and after the motion analysis, the researcher used correlational relationships to determine which variables contributed most significantly to the performance. Several conclusions were reached, including that the variables (acceleration in the first 10 meters, average speed for 10 meters, and time for the first 10 meters) achieved the highest correlation with performance, registering values of -0.698, -0.626, and -0.623, respectively. The acceleration for the first 10 meters is identified as the most influential independent biomechanical variable in performance, with a contribution percentage of 0.994. Increasing variables such as contact time, step frequency, and reaction time enhance performance. The researcher suggests prioritizing training to develop these biomechanical variables with the highest impact on performance and incorporating study findings into training programs to address weaknesses in both physical and technical aspects.

Keywords
Contribution Percentage, Biomechanical Variables, Achievement in 100-Meter Sprint, Reaction Time

INTRODUCTION

The biomechanical analysis is an effective method for identifying numerous and varied facts about the intricate motion paths of body parts in a scientific manner, as it relies on the physical and anatomical laws governing the human body (Challoub & Sabeeh, 2021). The 100-meter sprint event is one of the activities that relies on numerous variables. If these are studied through biomechanical analysis, we can understand the impact of these variables and their extent of contribution to achievement (Kareem & Abdul-Mohsen, 2023). The technical performance of the 100-meter sprint depends on specific biomechanical variables in a certain sequence. By isolating the variables that contribute most significantly to achievement, we can accurately direct efforts to achieve optimal performance (Hasan & Gambash, 2023).

The significance of this research is highlighted by the ongoing interest in athletic achievements and the continuous efforts to enhance them. Additionally, the importance of biomechanical analysis lies in uncovering the strengths and weaknesses of athletes. Furthermore,

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this research emphasizes the importance of providing mechanical information regarding the technical performance, particularly for the first 10 meters of the race.

The cognitive problem of this study revolved around whether it is possible to determine the numerical values for the starting and launching phase, as well as the contribution percentages of the first 10 meters in the 100-meter sprint event for men. Additionally, the study aimed to understand the extent of their impact on the final achievement. This prompted the researcher to delve into biomechanics and kinematic analysis of performance variables related to this distance, as well as their contribution to the achievement of athletes participating in the second round of the 2023 Iraq Championship.

The research aimed to identify the values of key biomechanical variables related to the technical performance of the first 10 meters in the 100-meter sprint event and to determine the contribution percentage of these variables to the final achievement.

The researcher assumed that there is variation in the contribution percentages of biomechanical variables to the achievement in the 100-meter sprint event. As for the research domains, the human domain represents the 100-meter sprint athletes participating in the second round of the Iraq Championship in 2023. The spatial domain was the Najaf International Stadium for Athletics. As for the temporal domain, it spanned from 15/02/2023 to 15/04/2023.

MATERIALS AND METHODS

Participants

The researcher obtained ethical approval from the Scientific Department of the University, as well as voluntary participation consent from elite runners registered with the Central Iraqi Federation for Athletics. This article's necessary ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 17.01.2024 Issue/Decision No: 2024/14. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures..

Procedures

The researcher employed a descriptive method with correlational relations and contribution percentages, as it suited the nature of the problem. The research population consisted of observations taken from the athletes participating in the second round of the Iraq Clubs Championship in Baghdad, totalling nine athletes. Each athlete competed in five races during the competition period, with training at the end of each week. The sample comprised these repetitions, amounting to 45 observations. The researcher also selected certain variables to ensure homogeneity in these characteristics, as shown in Table 1.

Table 1. The players' specifications and their homogeneity

Statistical Parameters / Variables	Measurement Unit	Arithmetic Mean	Median	Standard Deviation	Skewness Coefficient
Height	Meter	1.75	1.745	2.48	0.812
Mass	Kilogram	78.33	78.5	2.78	-0.583
Chronological Age	Year	26.33	26.5	2.24	0.412
Training Age	Year	8.22	8	2.79	-0.211

Table 1. shows that the values of the skewness coefficient range between (±1), indicating the homogeneity of the research sample individuals in these variables, i.e., the normality of their distribution.

Data Collection Methods

Used Equipment

Observation, which is one of the most important tools used in scientific research. Personal interviews with experts and coaches. Data registration form to record the probability values.

Used Equipment. A Korean-made analysis camera, CASIO Exilic EX-FH12.5, can capture at a speed of 120 fra-mes per second, with a total of (2) cameras used for analyzing and calculating the study variab-les. A 1-meter ruler for calibration with the motion analysis cameras. An electronic medical scale for measuring the runners' mass to conduct homogenization. A metric measuring tape for measuring the lengths of the runners to conduct homogeniza-tion. A Swedish-made starting block for a seated starting position. A Chinese-made race starting pistol, producing a sound signal, used for signalling the runners to start. Three stopwatches to record the arithmetic mean for each participant. The motion analysis software (Kenova) to analyze the variables specific to the study.

Biomechanical Variables

After reviewing specialized sources, the researcher selected the following variables as shown in Table 2.

Table 2. Kinematic Variables

Variables	Measurement Unit
Achievement	Second
Reaction Time	Second
Time for the First 10 Meters	Second
Average Speed	m/s
Acceleration in the First 10 Meters	m/s²
Number of Steps	Count
Step Frequency	Step/s
Step Length	Meter
Foot Contact Time	Second
Flight Time	Second
Peripheral Speed of the Foot	m/s
Peripheral Speed of the Arm	m/s

Exploratory Experiment

The exploratory experiment was conducted on 15/02/2023, using two cameras. It involved filming a single runner, who was not part of the research sample, at Al-Najaf International Stadium for Athletics. The purpose of this was to determine the camera placements, distances, required equipment, and potential obstacles that may arise during the main experiment.

The Main Experiment

The main experiment was conducted from 3/02/2023 to 2/03/2023, spanning an entire month during the competition phase. This extended duration was chosen as filming took place every Thursday at the end of the training week to ensure testing at 100% intensity, providing real numerical values closely resembling race conditions. Two analysis cameras of the type (CASIO FH13.5) were utilized, with a speed of 120 frames per second and a height of 1.2 meters. The first camera was positioned perpendicular to the first five meters from the starting point, while the second camera was placed at the second five meters from the starting point to cover the entire ten meters with high precision, as shown in Fig 1. The analysis was conducted using the (Kenova) software to calculate the variables.

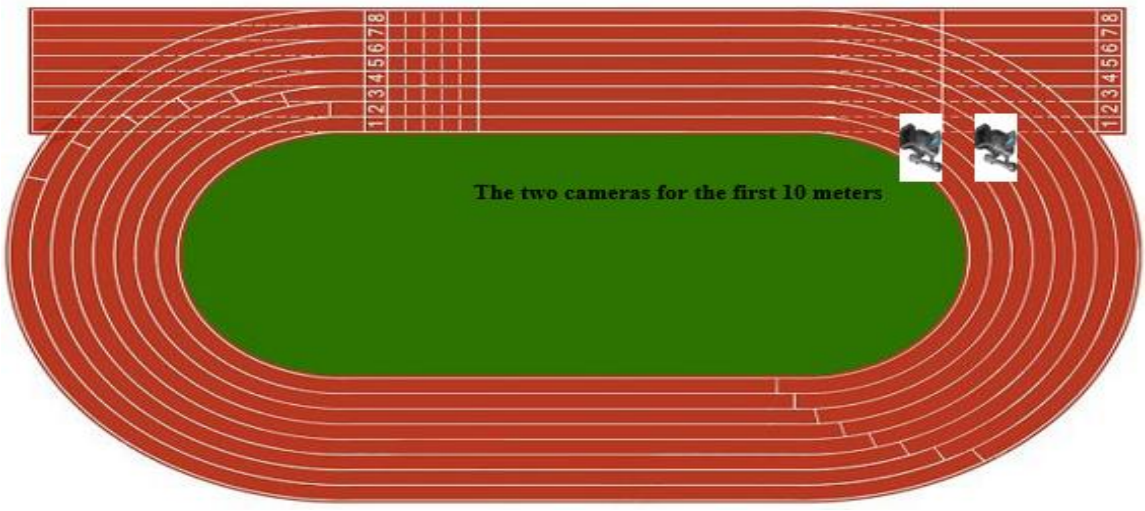

Figure 1. The method of filming the performance test for 100-meter sprinters

Calculation of Research Variables

The analysis begins by converting the film format from digital audio tape (DAT) to moving picture experts group (MPEG) for easy handling.

The researcher used the (Kenova 9.5) software to calculate the studied variables.

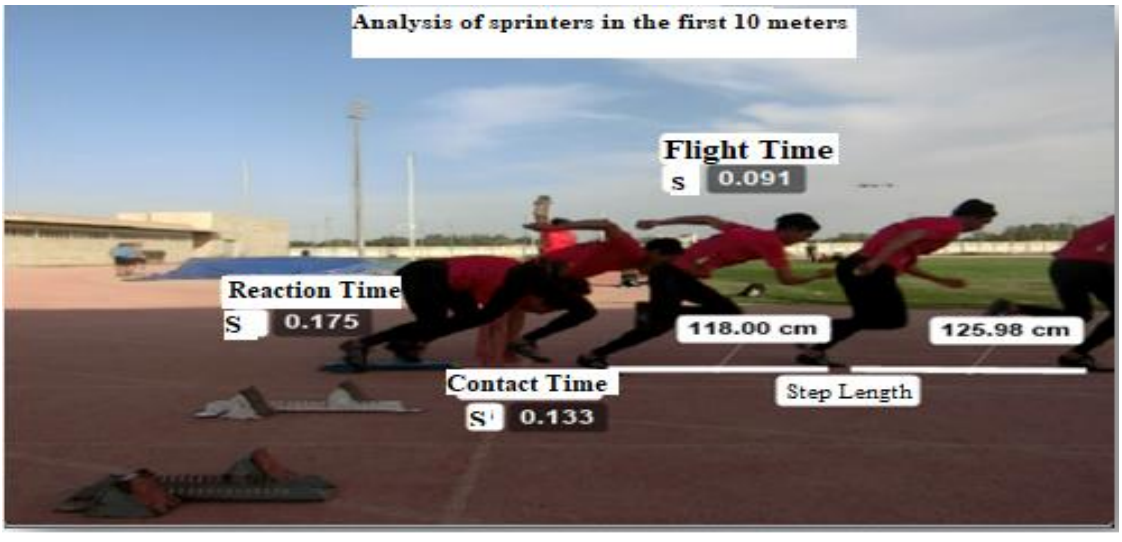

Figure 2. The calculation of variables related to the first 10 meters of the race

This software can accurately calculate real-time data once it is provided with information about the camera's speed and can track specific points to calculate foot and arm peripheral speed and measure step length, as shown in Fig 2.

Statistical Analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Simple Correlation, Multiple Correlation, Coefficient of Determination (Contribution Per-centage) R^2 in data analysis has been used.

RESULTS

Presentation of the results of biomechanical variab-les' descriptive values for the 100-meter sprint and their analysis and discussion.

Table 3. The descriptive values of biomechanical variables for the 100-meter sprint event

Variables	Arithmetic Mean	Standard Deviation
Achievement	10.861	0.304
Reaction Time	0.170	0.001
Time for the First 10 Meters	1.875	0.072
Average Speed	5.331	0.212
Acceleration in the First 10 Meters	3.211	0.283
Number of Steps	7.838	0.216
Step Frequency	4.177	0.213
Step Length	1.276	0.036
Foot Contact Time	0.134	0.002
Flight Time	0.806	0.024
Peripheral Speed of the Foot	4.699	0.105
Peripheral Speed of the Arm	2.284	0.338

The researcher resorted to calculating the arithmetic mean to describe the values with their central tendencies and express them as a single value. The standard deviation was also calculated to determine the accuracy of the mean in expressing the values of the variables. The arithmetic mean and standard deviation for the achievement were (10.861) and (0.304), respectively. The researcher considers this time to be relatively weak compared to the Iraqi national record of 10.32 seconds and significantly distant from Arab, Asian, and international standards. Additionally, the arithmetic mean and standard deviation for reaction time were (0.170) and (0.001). The researcher considers the reaction time to be somewhat good and comparable to the times of most runners at the international level. The mean and standard deviation for the time of the first 10 meters were (1.875) and (0.072). The researcher believes that the total time to cover the first 10 meters falls within the normal range. Additionally, the arithmetic mean and standard deviation for the average speed were (5.331) and (0.212), which is also considered within normal limits. Furthermore, the arithmetic mean and standard deviation for the acceleration in the first 10 meters were (3.211) and (0.283). The researcher believes that the acceleration rate did not ideally meet expectations. The arithmetic mean and standard deviation for the number of steps were (7.838) and (0.216). The researcher sees a clear weakness in step length, which resulted in this number of steps. Additionally, the arithmetic mean and standard deviation for step frequency were (4.177) and (0.213), and this is normal due to the deficiency in step length among the runners. Furthermore, the arithmetic mean and standard deviation for step length were (1.276) and (0.036), and the researcher considers this one of the most influential factors in the other variables. The arithmetic mean and standard deviation for foot contact time were (0.134) and (0.002), which is normal as runners try to increase the push-off through longer contact time. Finally, the arithmetic mean and standard deviation for flight time were (0.806) and (0.024). The researcher considers it to be an ideal and good time for the runners. The arithmetic mean and standard deviation for the peripheral speed of the foot were (4.699) and (0.105), and this speed is within the normal range. However, the arithmetic mean and standard deviation for the peripheral speed of the arm were (2.284) and (0.338), which is not ideal compared to the speed of the foot.

Presentation of the results of the biomechanical variables correlation matrix, analysis, and discussion of them

In Table 3, Pearson's simple correlation values are displayed between the independent biomechanical variables and achievement as the dependent variable, as well as the simple correlation values among the independent variables themselves. The researcher used an inferential method to definitively judge the

significance of the correlation, comparing the calculated correlation values with the table values at a degree of freedom (45) and a significance level (0.05). The determination was made that the correlations are statistically significant if the calculated values are (0.27 or more).

Table 4. The biomechanical variables correlation matrix and its analysis

Variables	Achievement	Reaction Time	Time for the First 10 Meters	Average Speed	Acceleration in the First 10 Meters	Number of Steps	Step Frequency	Step Length	Flight Time	Foot Contact Time	Peripheral Speed of the Foot	Peripheral Speed of the Arm
Achievement	1.000	-0.389	-0.626	-0.623	-0.698	0.114	-0.436	-0.126	0.129	0.543	0.114	-0.132
Reaction Time		1.000	-0.223	0.197	0.152	-0.336	0.029	0.362	-0.145	-0.072	-0.030	0.176
Time for the First 10 Meters			1.000	-0.997	-0.795	0.028	0.804	-0.013	0.201	0.310	0.149	0.004
Average Speed				1.000	0.823	0.019	0.833	-0.032	-0.182	-0.309	-0.140	-0.025
Acceleration in the First 10 Meters					1.000	0.198	0.783	-0.173	-0.068	-0.294	-0.107	-0.021
Number of Steps						1.000	0.517	-0.984	0.447	0.068	-0.041	-0.038
Step Frequency							1.000	-0.538	0.045	-0.204	-0.155	-0.015
Step Length								1.000	-0.445	-0.016	0.042	0.009
Flight Time									1.000	0.289	0.128	0.194
Foot Contact Time										1.000	0.051	0.057
Peripheral Speed of the Foot											1.000	-0.098
Peripheral Speed of the Arm												1.000

From the correlation matrix, we notice that the highest correlation values between acceleration in the first 10 meters, the average speed for the first 10 meters, and time for the first 10 meters with achievement in the 100-meter sprint event are (-0.698), (-0.626), and (-0.623), respectively. This indicates that these variables are the most independent and capable of explaining a significant portion of the variation in achievement and, therefore, have a high potential for predicting achievement. As for foot contact time, step frequency, and reaction time, their correlation values with achievement were (-0.543), (-0.436), and (-0.389), respectively. This implies a correlational relationship between these variables and achievement. As for the remaining variables, the peripheral speed of the foot, the peripheral speed of the arm, step length, flight time, and the number of steps, their correlation values with achievement were the weakest, with values of (0.114), (-0.132), (-0.126), (0.129), and (0.114), respectively. This indicates that there is no significant correlation between these variables and achievement.

Presenting the results of the contribution percentages of the independent variables to the achievement, analyzing them, and discussing them

The researcher utilized multiple correlations to find the relationship between several variables simultaneously and employed a significance test for the contribution percentage, as shown in Table 5.

Table 5. The contribution percentages of the independent variables to the achievement

Variables	Correlation Coefficient R	Contribution Percentage R2	Adjusted Square	Error Percentage
Reaction Time,				
Time for the first 10 meters ,				
Average speed,				
Acceleration in the first 10 meters,				
Number of steps,				
Step frequency,	0.865	0.749	0.665	0.1761
Step length,				
Foot contact time,				
Flight time,				
Peripheral Speed of the Foot,				
Peripheral Speed of the Arm.				

Table 5 in the second column shows the values of multiple correlations between the independent variables and the achievement. After calculating the highest simple correlation value for the independent variable (acceleration in the first 10 meters) (-0.698), the rest of the independent variables are explored using multiple correlations. It was found that the acceleration variable in the first 10 meters, the average speed for the first 10 meters, and the time for the first 10 meters formed the highest correlation value in the dependent variable (achievement). Subsequently, the variable of average speed formed the highest correlation value with the variable of time for the first 10 meters in the dependent variable of achievement (-0.997). Following that, the variable (step length) formed the highest correlation value with the variable (number of steps) in the dependent variable (achievement) (-0.984). Then, the variable (step frequency) formed the highest correlation value with the variables (reaction time, average speed, and acceleration) in the dependent variable values, with achievement at (0.804), (0.833), and (0.783). These variables are among the primary factors that have a direct impact on the distance covered in sprinting.

The results revealed significant correlations between the variables step frequency, acceleration in the first 10 meters, and average speed (0.823) and (0.833), which are some of the most important relationships in the matrix. As for the other correlations between the remaining variables, the results showed either weak or no significant correlations. The researcher attributes this to the low numerical values achieved by the runners, which did not meet the statistical requirements at the very least.

The researcher utilized the calculation of the coefficient of determination (as shown in the second column), "since the coefficient of determination indicates the percentage contribution of the independent variables to the variation that occurs in the dependent variable. It represents the percentage of the explained variations to the total variations" (Ayasirah, 2010). Through it, we can determine the potential of independent variables to explain the amount of variation in the dependent variable (achievement). As we can observe, the last model has the highest contribution percentage, meaning that these variables can explain 74.9% of the achievement.

Table 6. The analysis of variance (ANOVA) for the significance of the regression

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	3.052	11	0.277	8.941	0.00
Residual	1.024	33	0.031		
Total	4.077	44			

After observing the results in Table (6), it is possible to accept the alternative hypothesis and reject the null hypothesis. Table 6, which contains the F-value under a significance level of 0.05, indicates statistical significance.

DISCUSSION

The researcher attributes these results to both physiological and mechanical aspects. One of the most significant physical abilities associated with the 100-meter competition is the ability to endure rapid force, which some researchers consider to be the ability to maintain a high level of force through rapid contractions for a relatively long time against a high level of external resistance (Al-Rubadi, 2004). Additionally, the instantaneous force exerted in each step, representing the muscles' ability to overcome external forces in the shortest possible time with each ground contact (in every step), is also a significant factor (Sabri & Al-Kateb, 1980). The researcher believes that most of the sprinters work to achieve a noticeable increase in step length during this distance to maintain their average speed. At the same time, step frequency naturally decreases during the speed endurance phase, which is after 70 meters and towards the finish line, leading to an overall increase in time (the arithmetic mean for achievement is 10.89).

The researcher considers this time not good in general, which reflects on the starting variables up to the first 10 meters. It is assumed that athletes should be encouraged to maintain the same step frequency as much as possible while increasing step length proportionally. This could mean that a sprinter capable of covering short distances at high speed might also be able to cover longer distances at a slightly lower speed. The researcher agrees with Thorne and McKay that this may be a result of the training programs prepared by coaches, and it is necessary to focus on developing speed endurance. This aspect is one of the evaluation criteria for the training level (Thorne & McKay, 2008). As for the contribution percentage of acceleration in this specific distance (first 10 meters), the researcher attributes it to the fact that this phase is effective, and athletes often train for it from the special preparation period to the competition phase. Low-start training exercises are routines that sprinters use three to four times a week. These training exercises contribute to the development of effective acceleration, which helps reduce the time needed to cover a distance due to performing continuous repetitions at high-intensity speeds. This enhances the efficiency of the working muscles, thereby positively impacting achievement.

The researcher's perspective aligns with the views of Jamila and Ali Shabout, as they emphasize the execution of the start with the maximum force applied to reach the highest possible speed in progressive acceleration (Abdul Ridha & Al-Sudani, 2020). Finally, the researcher agrees with several studies regarding the importance of integrating the performance phases, as indicated by (Al-Fadhli et al., 2016; Majeed et al., 2016; Abdul Mohsen, 2018; Saleh et al., 2014; Hameed, 2019) state that speed events involve four fundamental stages: the start, acceleration, maximum speed, and maintaining maximum speed. Each stage complements the others, and each sprinter has unique characteristics. Some rely on starting and acceleration, others on maintaining maximum speed, and some aim to delay the deceleration phase as long as possible. The key factor in controlling race outcomes is the length and frequency of steps. Speed remains one of the most challenging abilities for coaches to develop, as it is an inherited trait. Regarding the time for the first 10 meters, acceleration, and average speed, the researcher believes that the contribution of these variables to the total time is due to the standard training exercises practiced by the sample individuals.

Considering that the time for this distance is effective and influential in achieving good acceleration, and since all training focuses on this aspect, a significant contribution percentage for this time to the achievement has been observed. Additionally, the type of training exercises used by the sprinters to reach maximum speed, especially plyometric (fast strength) training, plays a crucial role. The researcher agrees with Sareeh Al-Fadhli in stating that achieving success and reaching a high level in track and field activities is not solely achieved through using the best scientific methods in sports training, but also as a result of the proper use of modern measurements and tests, scientific planning accompanied by the results of relevant tests to the laws of motion, and their practical application in training (Ajeel & Al-Fadhli, 2020). Many scientific studies have also demonstrated the importance of developing and improving muscle strength and explosiveness, especially the specific

strength of muscles involved in performing rapid movements. Therefore, it has become clear that the strength of the muscles involved in rapid sprinting significantly determines the maximum speed of athletes. This relies on various types of jumping exercises, which constitute essential training units within the general training program for sprinters. Regarding step length and frequency, the lack of significance in step length and the significance in step frequency are quite obvious.

This is because the sprinter starts from rest (zero acceleration), and shorter steps help increase the acceleration rate, leading to a correlation between other variables, such as contact time and flight time. The increase in force occurs through an extension of the contact time to generate high-force push-off values. Finally, after achieving an optimal time for the first 10 meters, the results showed a significant correlation among the variables, as evidenced by achieving high values for the F-test and the coefficient of determination. The researcher agrees with a group of researchers on the importance of utilizing the science of biomechanical analysis and measurement devices that can simulate performance, such as DYNA FOOT. Hasan and Kambash recommend "the importance of measuring the ability to endure speed and various biomechanical variables in achieving success in the 400-meter hurdles race" (Hasan & Kambash, 2023). Furthermore, her previous study with Faten emphasized the importance of using biomechanical analysis, a science that discovers and accurately identifies points of weakness and strength (Mualla & Hussein, 2022).

The researcher emphasizes the importance of the time taken to cover the first 10 meters, as evidenced by a previous study conducted with Jasim, which indicates the time taken to cover the first 20 meters in the 100- and 200-meter races has a significant and influential contribution to the final achievement. This is due to the training programming for starts, reactions, and acceleration within the daily training regimen for athletes up to 60 meters (Jasim & Hussien, 2023). The researcher believes that the extracted numerical values and their contribution percentages provide important indicators for coaches to program their sprinters' training. This aligns with Kareem and Abdul-Mohsen in "adopting the data considered by the researchers as fundamental in training sprinters for the 100-meter hurdles event" (Kareem and Abdul-Mohsen, 2023). The researcher sees the possibility of utilizing the training of the variables under study through high-intensity repetitive and periodic loading, given their impact on sprinters, both at the beginning of the race in terms of momentary forces and at the end of the race in terms of speed endurance and strength endurance. Hasan and Gambash are mentioned in another study regarding sprinting, stating that "there should be a focus on both high-intensity interval training and high-repetition training to develop speed endurance and strength endurance for the 400-meter race" (Hasan & Gambash, 2023). The researcher emphasizes the importance of developing physical capacities alongside biomechanical indicators, as previous research with Jamal and Sabeeh has shown that "physical capacities have a direct impact on mechanical variables in improving the final achievement (Jamal & Sabeeh, 2022). The researcher finds that it is essential to have the necessary tools and assistive devices in the training process to enhance the value of contributing variables. In this regard, the researcher agrees with Al-Dulaimi that creating cost-effective assistive tools that serve the training and educational goals of young trainees and using a more diverse range of assistive tools can increase the effectiveness of learning the art of running the 100 meters (Al-Dulaimi, 2022). As the topics of biomechanics are related to performance technique, the researcher aims to connect the current researched variables with compatibility exercises due to their importance in improving these variables. In this regard, the researcher agrees with Ghanim and Jaleel that multiple exercises that align with each athlete's abilities lead to the development of physical capabilities and consequently enhance their technical performance (Ghanim & Jaleel, 2022). The researcher once again sees the importance of physical capabilities in enhancing achievement through their contribution percentage to mechanical variables. The researcher has previously demonstrated in her previous study with Challoub and Sabeeh that it was concluded that there is a significant correlational relationship between the standard scores of physical tests for acceptance and the achievement in the 100 meters (Challoub & Sabeeh, 2021). Therefore, those involved in performance development should pay attention to the aspects mentioned.

Conclusion

The variables (acceleration in the first 10 meters, average speed for the first 10 meters, and time for the first 10 meters) achieved the highest correlational relationships with performance in the men's 100-meter sprint event. Acceleration in the first 10 meters is considered the most independent biomechanical variable contributing to achievement in the men's 100-meter sprint event. An increase in variables (foot contact time, step frequency, and reaction time), whether in an inverse or direct manner, assists the sprinter in achieving a high-performance time.

Recommendations

It is essential to focus training efforts on developing biomechanical variables that have shown the highest levels of contribution to achievement. The necessity of incorporating the study's findings into the development of training curricula to address weaknesses in both the physical and technical aspects. The necessity of including exercises based on quantitative kinematic analysis in training programs and curricula designed to develop mechanical aspects of technical performance in the men's 100-meter sprint event.

Conflict of interest

The authors declare no conflict of interest. In addition, no financial support was received.

Ethics Statement

The interventional study was approved by the University of Baghdad, College of Physical Education and Sports Sciences for Women.

Author Contribution

Study Design, SBS and SD; Data Collection, MM; Statistical Analysis, SD; Data Interpretation, MM and SD; Article Preparation, SBS and SD; Literature Search, SBS and MM. All authors read and accepted the published version of the manuscript.

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RESEARCH ARTICLE

The Effect of using Teaching Plans According to the Van Hiele Method in Learning the Dribbling Skill in Basketball for Students

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Abstract
The study aimed to prepare teaching plans according to the Van Hiele method in learning the basketball dribbling skill, and to identify its effectiveness for intermediate school students. The researchers used an experimental approach in the style of two equal groups. The researchers defined their research population as students from Al-Intisar Intermediate School for the academic year (2023-2024), who numbered (564) students. The study sample was deliberately determined to be represented by second-year students, whose number was (90) students, and their percentage was (15.95%). from the research community, and the research sample (45) students, representing (50%) of the total second-year students, was selected in an intentional manner. They were divided into two experimental and control groups, represented by (20) students each, and (5) students were selected for the exploratory experiment. The researchers prepared teaching plans for eight weeks on Monday, 16/10/2023, and the last lesson was on December 4, 2023. As for the control group, the teacher used his usual method, after which a pre-test was conducted for the sample, then the teaching plans were implemented on Sample on Monday 16/10/2023, and the last lesson was on 25/12/2023. As for the control group, the teacher used his usual research method. The researchers concluded, with the results of the research, that using the Van Hiele method is effective in learning the skill of dribbling in basketball.

Keywords
Van Hiele Method - Dribbling - Basketball

INTRODUCTION

The rapid development that has been achieved in sports levels, for all games, was not the result of coincidence and randomness, but rather came as a result of sound planning based on scientific and technical foundations in developing educational and training curricula according to the requirements of the age stage of the students and paying attention to the integration of their preparation in all skill, physical and psychological aspects (Abu Sheikha, 1998), "Scholars have classified teaching methods and learning methods into many forms, based on criteria, the most important of which are the teacher's effort, the learner's effort, and the nature of the material to be learned. We know that the role of the teacher is the focus of the educational process, and he is the foundation and controller of the system and the sender of information and its application, through the traditional learning method." It is the teacher using multiple methods without focusing on one type (Arab and Kazem, 2009), which is why we find that he does not achieve satisfactory results as if focusing on one type of educational method. However, in light of modern technological development, the matter has become different, as the learner is viewed as a developing individual with his various physiological, cognitive, motor, and social aspects.

Among the modern methods of learning are mastery and cooperative learning" (Melhem , 2001) , and that educational sciences have taken By keeping pace with the development taking place in all sciences, including the science of teaching methods, as it is a science concerned with

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improving the academic level of students, as different teaching methods are used to achieve educational goals in educational institutions (Radhi and Obaid 2020). It can be said that teaching leads to developing minds and employing them for the sake of knowledge, thought, and skill performance, and in order to seek to develop sciences. Physical education must rely on modern methods, and one of these methods is the Van Hiele method, as it is one of the methods that helps the student to learn effectively, and to monitor and regulate his performance by using his levels of thinking in a gradual manner according to the educational stages, and then works to accelerate the learning process. It has been known Van Hiele's method is "an educational/learning design that assumes that the process of moving from one level of thinking to the next is the result of purposeful and organized directions through discovery, competition, and integration" (Latif, 2021).

Goal clarity simply means the extent to which students understand the goals and feel that they are clear. Clarity, certainty, acceptance, and commitment to the goal are all essentially related to effectiveness and satisfaction in general and indicate the level of Variation in actually desired performance" (Mansour, 2023) .It is nothing but an attempt to find an opportunity to advance to the opposing team's basket, and this happens when the player reaches the opposing team's basket with the ball legally, avoiding the mistake of walking with the ball. Accordingly, low dribbling is the player's movement with the ball inside the court, being the effective offensive means of transfer.

Moving on the field during play is usually used to advance the ball and when there is no room to use handling to move. It is defined as the process of pushing the ball to the ground with one hand and in a specific direction and bouncing it from the ground to one of the hands as well (Shaker, Tuama, & Radhi, 2022). From here came the importance of research in conducting experimental research, to find out the extent to which the effectiveness of the Van Hiele method in learning some low-level dribbling skills. It is one of the studies that dealt with this method in the field of physical education and sports sciences with the aim of stimulating students' thinking and helping them in acquiring, storing and retrieving information, and then developing the educational process and skill performance "The player must be accustomed to not looking at the ball, but rather his gaze is distributed to his teammates and opponents. As for the unused arm, it should be raised at shoulder level, as if the player is looking at his watch, in order to protect the ball from the opponents' movements (Bremer et al., 2019). Learning to dribble begins from standing, then from walking, and then from running, and this must be ensured. To dribble the ball to a distance slightly in front of the side of the body, and this distance must be compatible with the speed of the player in running. The greater his speed, the greater the distance of the bounce forward." (Jassim , 2023).

The research objective is to preparing teaching plans to identify the effectiveness of the Van Hiele method in learning the low basketball dribbling skill for the research sample.

MATERIALS AND METHODS

Research Methodology:

The researchers used an experimental approach using equal groups, as shown in Table 1.

Table 1. shows the experimental design

Groups	1	2	3	4	5
	Pre-test	Independent variable	Post-test		
Experimental	Low dribbling skill	Van Hiele method	Low dribbling skill	The difference between the pre and post tests	The difference between the two groups in the posttest
Control		Method used			

Participants

Community and sample research

"The goals that the researcher sets for his research and the procedures that he uses are what determine the nature of the population or sample that he chooses" (Khuraibet, 1988). The researchers defined the research population as students from Al-Intisar Intermediate School

(2023-2024), who numbered (564) students for all grades. The researchers deliberately chose the sample, represented by second-year students, who numbered (90) students and their percentage was (15.95%). The research sample was determined. (45) students, representing (50%) of the second-year students, in an intentional manner. The sample was divided into an experimental group and a control group, consisting of (20) students for each group and (5) students for the exploratory experiment. "The sample refers to a distinct and selected subset of the study population. It is distinctive in that it has the same characteristics as the population, and selected in that it is selected from the study population according to specific procedures and methods." (Al-Batsh and Abu Zeina, 2007).

This article's necessary ethics committee permissions were obtained with University of Baghdad Social Sciences for Woman Ethics Committee Commission Date: 23.1.2024 Issue/Decision No: 2024/1. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

Homogeneity and equality of the research sample

The researchers collected data on homogeneity and parity from the research sample by returning to school records about their ages by month and also measuring height and weight. After analyzing the data, it was confirmed that the sample was homogeneous, and Table 2 shows this.

Table 2. Shows the statistical parameters of the variables of height - weight - age

Variables	X	SD	Median	Skewness (±3)
Length – cm	148,12	6,85	147	0,490
Weight - kg	59,20	7,73	58	0,465
Age - year	12,23	1,19	13	0,579

Arithmetic means (X), Standard Deviations (SD)

From Table 2 it was shown that the values of the skewness coefficient were all limited to (±1). The researchers conducted the pre-test equivalence of the sample for the two research groups, the control and experimental groups, for the low dribbling skill, as in the table below.

Table 3. Shows the equivalence of the skill test used

Groups		Measuring Unit	X	SD	T value Calculated	Error percentage
Low dribbling	Experimental	(time/second)	24,794	1,775	0,715	0,295
	Control		24,413	2,142		

Arithmetic means (X), Standard Deviations (SD)

The tabular t value is (2.01), the degree of freedom is (38), and the percentage error is (0.05). From Table 3, it was found that the significance of the differences is not significant. This indicates that the two groups are equivalent in the level of performance of the low skill of dribbling in basketball.

Test is under investigation

The test was determined by one of the researchers because they are experienced and specialized in testing and measuring basketball.

Test is under investigation

Low dribbling test **(**Abdel Dayem , and Hassanein , 1984**)**

Objective of the test: to measure the performance of dribbling between signs.

Tools

A basketball, a stopwatch, chairs or signs placed as shown in the adjacent figure, noting that a line is drawn for the start and end at a distance of (1.5) m from the second chair, and the distance between the signs is (2.4) m.

Performance specifications

The tester stands behind the starting line with the ball, and when he hears the start signal, he

runs the zakzaki between the signs while constantly dribbling with the ball, provided that the work is performed back and forth until he crosses the starting line, where the time in which he covers the specified distance is calculated according to the previous performance method from the moment the order is issued. By starting until the laboratory crosses the starting line after going and coming back.

Conditions

The tester may use either hand during the interview. The ball must be touched during the dribble in a legal manner. The laboratory is allowed to perform two attempts, provided that the best of them is counted.

Registration

The time during which the tester performs the required work is calculated from the moment of the start signal until he crosses the starting line after performing the test, and the time is calculated for him in the two attempts, provided that the lesser time (1/100 of a second) is calculated for him.

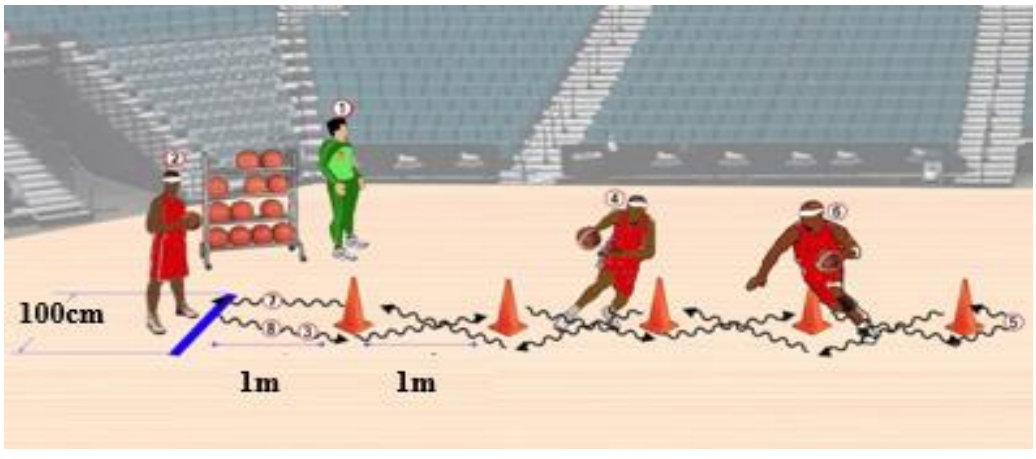

Figure 1. Low dribbling test

Field research procedures:-

Exploratory experience

"The exploratory experiment is considered a preliminary experimental study carried out by the researcher before he carries out his research, with the aim of choosing research methods and tools, and for the purpose of determining the level of devices used and selecting them, and knowing the negative aspects that the work will face. It is a practical way to reveal the obstacles that the researcher may face while carrying out the main experiment, and it is considered advance preparation for the requirements of the experiment." In terms of time, cost, auxiliary personnel, devices, tools, etc." (Shaalan, Aboode, & Radhi, 2022).

Therefore, the two researchers conducted the exploratory experiment on a survey sample, which consisted of five students from the research community, on Thursday (12/10/2023) at exactly nine o'clock in the morning on the basketball court in Al-Intisar Intermediate School, by applying the specific test for the low dribbling skill. To learn about the suitability of the test for a sample, the validity of the tools, and learn how to apply the tests, their sequence, the method of recording, and the length of time to apply each test.

Scientific foundations of the skill under research (validity, stability, and objectivity)

The researchers extracted apparent validity by presenting the test to some arbitrators who approved the test. "One of the components of validity is the test's ability to distinguish between different abilities" (Hashem, Al Edhary, Radhi, & Hmeid, 2022). After completing the exploratory experiment, the researchers processed the data statistically, By using the simple correlation coefficient (Pearson) to test low dribbling in basketball, it was shown that all skills have a high degree of stability, as shown in Table (4).

Table 4. shows the reliability coefficient for the skill tests

Test	Reliability coefficient	Type sig
Low dribbling	0,89	sig

Pre-tests of the research sample

Pre-tests for the research sample were conducted for the experimental and control groups on Sunday, 15/10/2023, in Al-Intisar intermediate School.

Preparing teaching plans

The researchers prepared teaching plans for eight lessons according to the Van Hiele method, which included exercises related to the skill and divided the plan into the introduction, the main educational and applied part, and then the conclusion.

Main experience

The implementation of the first lesson to teach the skill specified for the lesson plan, as shown in Appendix (1), a sample lesson plan for the experimental group, was conducted on Monday, 16/10/2023, and the last lesson was on 4/12/2023. As for teaching the control group, the teacher used his method. The follower.

Post-tests

The researchers conducted the post-tests after completing the application of the educational units to the experimental group, amounting to (8) educational units, on Wednesday (12/27/2023) in the Al-Intisar intermediate School playground, taking into account all the conditions, conditions and procedures under which the pre-tests were conducted.

Statistical Analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Presentation of the results of the differences between the pre-test and post-test for the two experimental groups

Table 5. shows the values of the arithmetic means for the two experimental groups for the skill test

Skill	Groups	Pre-test		Post-test		Difference of the arithmetic means	Differences of standard deviations	Standard error	T value	Level sig	Type sig
		X	SD	X	SD						
Low Dribbling	Experimental	24,794	1,775	20,594	1,889	4,200	2,734	0,449	8,414	0,000	sig
	Control	24,431	2,142	22,474	1,834	1,984	2,365	0,432	4,592	0,000	sig

Arithmetic means (X), Standard Deviations (SD)

The tabular (t) value is (2.09) with an error rate of (0.05) and a degree of freedom (19). It is evident from Table 5, as we note the values of the arithmetic means, the standard deviations, and the value of (t) calculated between the pre- and post-tests for the experimental group, as well as the values of the differences for the arithmetic means and the standard deviations for the pre- and post-tests for the low dribbling skill in basketball, as the value of the arithmetic mean for the low dribbling skill for the pre-test reached (24,794) and the standard deviation (1,775). The arithmetic mean value for the low dribbling skill for the post-test was (20,594) and the standard deviation was (1,889), while the calculated (t) value was (8,414). Since the calculated (t) values are greater than the tabulated ones at the significance level at (0.05), which indicates that there are significant differences between the pre- and post-tests and in favor of the post-test for the experimental group for low dribbling skill.

Through Table 5, we note the values of the arithmetic means, the standard deviations, and the value of (t) calculated between the pre- and post-tests for the control group, as well as the values of the differences for the arithmetic means and the standard deviations for the pre- and post-tests of the low basketball dribbling skill, as the value of the arithmetic mean for the pre-test reached (24,431). The standard deviation was (2,142), and the mean value for the post-test was (22,447) and the standard deviation was (1,834), while the calculated (t) value was (4,594), and since the calculated (t) values are greater than the tabulated ones at the significance level of (0.05), which indicates the presence of differences Significant between the pre and post tests and in favor of the post test.

Presenting the results of the post-tests for the experimental and control groups

Table 6. Shows the values of the arithmetic means for the experimental and control groups

Variables	Groups	Mean	Standard deviation	T value	Level sig	Type sig
Low dribbling	Experimental	20,954	1,889	3,672	0,001	sig
	Control	22,447	1,837			

Degree of freedom (38) and tabulation (2.00) with an error rate of (0.05). From Table 6 we note the values of the arithmetic means, the standard deviations, the calculated (t) value, and the error percentage for the post-test for the experimental and control groups for the low dribbling skill in basketball, where the arithmetic mean value for the low dribbling skill in the post-test for the experimental group reached (20,594) and a standard deviation of (1,889). For the control group, the arithmetic mean reached (22.447) with a standard deviation of (1.834), and the calculated (t) value reached (3.672), while the standard error percentage reached (0.01). Since the value of the standard error percentage is smaller than the significance level at (0.05), This indicates that there are significant differences in the post-test between the experimental and control groups, in favor of the experimental group.

DISCUSSION

After presenting the results for the research sample in Tables 5-6, the researchers concluded that there are differences in all the results of the low dribbling skill test for both groups, and the researchers attribute the reasons for the differences and results to the effectiveness of the Van Hiele method for learning the low dribbling skill in basketball, and to the Van Hiele method. Hiele is instrumental in learning dribbling skills "Because the steps of the Van Hiele method allow the learner to create a meaningful understanding by linking previous knowledge and integrating it with what has been learned, as these steps begin by presenting a real problem that students face and then work on analyzing it and finding appropriate solutions to it through the knowledge and skills that are acquired" (Fouad, 2008). "Learning cannot occur except through practice, and there cannot be learning unless it occurs repeatedly with a change, even if this change is simple, and through practice and reinforced repetition there is a gradual improvement in the performance of the skill, and training is the only way to discover mistakes then correct it." (Arab and Kazem, 2009).

The researchers attribute that the reason for the development of the performance of the control group, which learned the skill according to the method used by the teacher, is that the learning process in basketball requires continuous feedback throughout the learning period, so repeating the skill with the teacher's organized observations and directing him to perform correctly, especially in the stages Initial learning, since the students are beginners, that is, they did not have previous experience in the skills under research. In the early stages of the learning process, the focus was on direct feedback after each performance. As the research sample's performance level advanced, the feedback was reduced, which helped in the transition. Between the stages of learning in a smooth manner, and developing the kinetic program stored in the kinetic memory of the skill, as, "Feedback increases performance improvement in the early stages of learning because learning takes the initial image of the skill, develops an appropriate kinetic program for the response and implements it, and then compares the result with the established program." (Khayoun, 2002). "The bottom line is that the role of the student is to repeat and practice, that is, the teacher gives the ideas and topics complete and ready for the students, and they do not have to explain and analyze, but rather apply and practice to master the skill to be learned. This is what confirms"when the learner faces a problem or situation, learning occurs" (Zaitoun, 2007).

Through the above presentation, analysis and discussion of the results, the researchers reached the following conclusions. The results of the arithmetic means of the experimental group in the pre- and post-tests proved that there are differences

in favor of the post-tests , the method used by the teacher helped in learning the skill of dribbling among members of the control group , the Van Hiele method is effective in learning the low skill of dribbling in basketball under study for the benefit of the sample of individuals in the experimental group and the Van Hiele method lessons had a positive impact on learning low-level dribbling, better than the method adopted in school. Based on the above-mentioned conclusions reached by the researchers, the following is recommended: Using the Van Hiele method to learn other skills and the technical stages of other sporting events, as this method is modern , and conduct other similar studies using the Van Hiele method on samples of different genders, such as female students.

The Ethics Committee

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Conflict of Interest

The authors declare no conflict of interest. In addition, no financial support was received.

Author Contributions

Planned by the authors: Study Design: OTS and YMW, Data Collection: OTS and YMW, Statistical Analysis: OTS and YMW, Data Interpretation: OTS and YMW, Manuscript Preparation: OTS and YMW, Literature Search: OTS and YMW .All authors have read and agreed to the published version of the manuscript.

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Appendix (1)

Physical education lesson plan for intermediate school The first educational unit Time: 45 minutes Week: first Number of students: 20 students	Educational objectives 1. Accustoming them to control and order Educational objectives (skills) 2. Identify the low skill of dribbling 3. Performing the low dribbling skill.

ction	Exercise	Time	Behavioral goals	Physical activity and skill	Organization	Tools	calendar
Preparatory 8 min	introduction	3 min	- The student must be psychologically prepared and have a positive mood to start the lesson. - The student begins the lesson with activity.	Bringing balls, preparing the necessary supplies for the educational unit, students standing in one row, taking attendance, starting the educational unit with a sports salute	xxxxxxxxxxxxxx X	Whistle	Confirm the system
	Warm up	5 min	- The student must reach the warm-up stage for functional devices. - The student should carry out the exercise according to the instructions.	- Regular walking, light jogging with arms rotated forward and backward, light jogging, normal walking. - (Standing, lateral bending) pressing the arms to the side and extending them (4) reps. - (Long sitting, hugging) arms high, bending the torso forward and holding (5) reps - (Standing with your waist down) Jumping by alternating feet front and back (2) several times	xxxxxxxxxxx xxxxxxxxxxx x x x X x xxxxxxxxxxxx	Basketball court-	Emphasizing organized running, keeping distances between students, and correcting performance with the whistle.
Main 35 min	Educational 10 min		- The student should link previous experience with offensive basketball skills to new information - For the student to know how to perform the low skill of dribbling. - The student should observe the motor performance model for the low dribbling skill.	- Reviewing what the student has learned about offensive skills in basketball, answering students' inquiries, and giving feedback to the students. - Provide a definition of the low skill of dribbling. - A general idea of the low dribbling skill, an explanation of the conditions that must be met when performing low dribbling, and an explanation and presentation of the skill. - Explaining and presenting exercises for handling and receiving skills.	X X X X X X X X X X X X X X X X X X X X X X X	Basketballs (8) Signs(4)	
	Applied 25 min		- The student performs the low-level dribbling skill correctly. - The student should observe the motor performance of the low dribbling skill. - The teacher corrects errors by following up on students during practice.	The teacher divides the students into four groups and asks them to perform the exercises according to their sequence, under the supervision and follow-up of the researcher: Exercise(1) Exercise(2) Exercise(3) Ensure understanding of skill performance. The students apply the skill of handling and receiving, and the teacher corrects the errors and emphasizes the participation of all students in applying the skill and performing the exercises respectively (1 ,2 ,3)		Basket balls (8) Signs (4)	- Emphasis on the participation of all students. - Give sufficient time to apply the exercises included in the lesson. - Follow-up by the teacher to correct errors. - Observing students and urging them to perform and apply exercises
	Final 7 min		-A mini game (and low dribbling)				Emphasis on adherence to the rules of the game

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RESEARCH ARTICLE

Effect of Multi- Resistance Exercises on Some Physical Variables and Level of Performance in 100-Meter Short Sprint Effectiveness

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Abstract
Research aims to identify impact of multi - resistance exercises program on some physical variables and level of performance among two runners of activities of short Sprint Effectiveness 100 meters through use of new methods and means in sports training that helps improve some physical and motor capabilities and level of performance. researchers used experimental curriculum, and researcher was chosen by research sample in intention of (18) runners from Basrah Governorate clubs in activities of microscopic, 100 meters, youth category (16) years, results of research showed that multi -shape resistance exercises have a positive impact on level of achievement in two distances of distances short, which was represented in physical variables and level of achievement, and that re are differences between two groups (experimental and controlled) in changes of physical capabilities and level of achievement, as experimental group that used program of multi -resistance training (experimental) has surpassed control group that used program (classic) most important recommendations were: Take advantage of training program in terms of multiple forms of resistors to develop level of achievement in activities of short sprint 100 meters. It is important to focus on enhancing the physical abilities of young individuals during their developmental phases by utilising various types of resistance training. This is because it has a beneficial effect on improving their overall performance level. Conduct further studies that replicate the existing research methodology, with resistors that are distinct from the ones now being used.

Keywords
Multi- Resistance Exercises, Physical Variables, 100-Meter Short Sprint Effectiveness

INTRODUCTION

In recent times, there has been a growing global interest in sports training that focuses on enhancing and developing athletic performance in individuals of various ages (Gallahue & Donnelly, 2007). Modern sports training plays a crucial role in the lives of athletes, as it is a well-structured educational process based on solid scientific principles. Its aim is to help athletes reach their optimal performance level and ultimately achieve their sports goals (Paramitha et al., 2021). To accomplish this, trainers must carefully plan and organize training sessions, considering the physical and technical abilities of their players, within a unified framework. This is particularly important during races and competitions (Otte et al., 2020). The global pursuit of scientific advancements in training methods aims to disseminate knowledge and concepts to coaches in a user-friendly manner, enabling them to achieve better levels of proficiency (Kingsbury, 2022). There has been a noticeable enhancement in the overall worldwide performance in trauma races, necessitating the implementation of scientific training methods to effectively address this progress (Bodemer, 2023). Utilizing suitable

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training techniques and strategies enhances the motor performance and fitness aspects of short programs based on scientific principles, while avoiding conventional training methods (Cormier et al., 2022). It is imperative to maintain consistent training efforts from a young age to adulthood (Lau & Lee, 2021; Zatsiorsky, Kraemer, and Fry ,2020) argue that utilizing a training method that integrates various resistance tools based on scientific principles leads to improved physical, muscular, and motor fitness, while also acting as a preventative precaution against accidents. The progress of sports levels is contingent upon various factors, such as enhancing the functional capacity of sports body systems (Fyfe, Hamilton & Daly, 2022). This can be achieved through the development of training methods and techniques that aim to enhance performance and attain the highest levels of accomplishment (Rivaldo & Nabella, 2023). Training methods play a crucial role in realizing this objective (Leal Filho et al., 2019). And that one of most important advantages of resistance exercises is its diversity and many methods, as Swartz, Floyd and Cendoma (2005) indicates that provision of a kind of resistance that ranges from a few or non -resistance and n begins to increase and difficult Where a person can continue to increase strength generated during every movement of movement, and that resistance includes central and central components of repetition, but to ensure that this happens perfectly during full movement of movement, resistance must be prepared properly , and thr research problem explain this to fact that coaches use a large number of auxiliary and private exercises without realizing relative importance, which means that re are many exercises that have a limited effect in training process, and despite this y are used excessively within training units, which leads to a lot From effort and loss of a lot of time in training for training and training paths that are useless and work in direction of general and not muscular work, which affects outputs of general achievement level of effectiveness, and therefore researcher tries to use multi -shape resistance sprint athletes by implementing structured training

exercises to increase effectiveness of training with lowest effort and shortest time as well Breaking monotony and boredom barrier during training units , and research aims was identify the effect of using multi-shape resistance exercises on some physical variables and level of achievement in effectiveness of Short Sprint Effectiveness 100 meters.

MATERIALS AND METHODS

Participants

Researchers used experimental approach as one of research means to solve research problem, as experimental curriculum is "a deliberate and seized change on specific conditions of a specific incident and note resulting changes in same incident to interpret it and with design of experimental and control groups and Pre-test and post- test.

This article's necessary ethics committee permissions were obtained with College of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq. Social Sciences Ethics Committee Commission Date: 17.01.2024 Issue/Decision No: 10. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki , and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

Field Research procedure

Community and sample research

The research community determines players of Basrah Governorate in effectiveness of Short Sprint 100-meter youth category (16-17) years of age, which (18) players and thus represents 80 % of original research community.

Table 1. Shows Homogeneity of sample through values of kurtosis factor

Variables	Unit of measurement	M	SD	Torsion coefficient
Age	year	17.02	2.04	0.656
Length	Cm	158.32	6.01	0.575
Wight	Kg	61.82	0.516	-0.344

Training age	year	2.11	1.00	0.177
Achievement 100 m	Sec	11.2	0.004	0.051

It is clear from Table (1) that extracted values fall within natural curve, "as values of coefficient kurtosis are limited between (+3) and (-3)". Where "good distribution of sample can be known from number of Values, proximity to each or, or separation, and separation from each or, and thus we have a measure of amount of homogeneity of statistical group and the research tools was Chinese -made weight and length device, Lap-top Cori7, 2 whistles, a 30-meter measuring tape, 24 training cones, rubber tapes, weight weights, pulse examination device, blacks loading with an iron with different weights, and medical balls of different weights

Tests used in research

Test ran by jumping in 10 seconds (Haj-Sassi et al., 2011). Test aim: measuring strength with speed.

Tools: Time Hour, Line drawn on Earth is a signal to start jumping, person.

Test procedure: Laboratory stands behind starting line with a distance determined by laboratory to carry out approximate cod Measuring distance later.

Calendar: Distance traveled by laboratory is recorded in 10 seconds.

Test (30) meters from start flying (Kavanaugh et al., 2011).

Test aim: measuring maximum speed.

Tools: Time Hour, three parallel lines drawn on ground distance between first lines second is 10 meters and between second and third line 30 meters).

Test procedure

Laboratory stands behind first line, and upon hearing starting signal, laboratory will be enemy until he crosses third line, time is calculated from second line to third line.

Running test (40) meters of low start (Mudian, Setiawan & Lanos, 2021).

Purpose of test

Measuring transitional speed.

Tools

Time Hour, Determination of Parallel 40 meters. The first line represents the starting line represents the finish line. Performance description: - laboratory stands behind the starting line from low starting position, and when hearing absolute whistle, laboratory begins with running and at highest possible speed until finish line is passed. Method of registration: Laboratory is given only one attempt and calculation of time that laboratory takes from starting line to finish line in second.

Pre- Test: Researchers conducted Pre- test on 8/2/2023, at exactly four o'clock in field of Faculty of Physical Education and Sports Sciences / Basrah University. Researcher was fixing all conditions of test.

Exploratory Experience

Exploratory experiment was conducted on 9/2/2023, where it aimed to achieve following: Ensure validity of destruction and measurements required for tests for purpose of conducting president. Ensure validity and calibration of devices and tools used under research. Training assistants in methods of testing procedures for measuring variables under research, and results of this experience were confirmed by achieving all aim.

Main experience (training program)

Start of work on training program with multi -shape resistance on 12/2/2023, as program included (24) training units distributed to (8) weeks at fact that (3) and training plots per week. The training program aims to improve (physical capabilities and achievement level) of short 100 meters effectiveness for young people by designing a training program using exercises with multi -shape resistors.

Foundations of proposed training program

Researcher observed following scientific foundations when designing proposed training program:

First: Program is appropriate for age stage (research sample) and subject to general aim.

Second: Defining the aim of a program and aims of each stage of its implementation.

Third: Determining most important duties of training and ease of availability of capabilities, tools and devices used.

Fourth: Considering individual differences between players.

Fifth: Considering evidence of evidence to reach sample members to normal state.

Appropriate formation of components of training (performance time, rest time, repetition time.)

Sixth: gradual increase in pregnancy and appropriate progress guidance for training loads and dynamics of training loads.

Determining Time of Training unit

Each of them agreed of Time of training unit at this age ranges between (65: 100) minutes, by (3-4) training units per week (Church et al., 2010). Based on the above, number of training units was determined by (3) training units per week for experimental group.

Determine time of training unit parts

Time of training unit for experimental group was determined from (65) minutes to (75) minutes, according to scientific sources, studies, and previous research. Considering the time of training unit, which is determined by a time (65 - 75 BC), researcher distributed time of training unit parts.

Content of training unit parts

Warm-up for 15 minutes.

Determine Resistors used in training program

Resistors used in sports field in general, which can be used in field of short -ranked activities, have been identified in particular and based on large number of performance and possibility of designing many special exercises with possibility of placing composition to suit dental stage and thus determined resistances used under research in following (resistance to colleague's body, Medical balls resistance, rubber tape resistance, weightlifting resistance).

Determining part of Resistance part

Experts in the field of sports training agreed that the time of part of resistance training in training unit ranged from (30: 55) minutes and based on foregoing time of part of resistance training was determined from 40: 50 minutes.

Dynamic formation for formation of training for physical preparation

During special numbers phase, researcher used during various stages of program basic formation 1: 2 as gradient in degree of pregnancy was used through use of medium pregnancy during first stage and high pregnancy during second stage and maximum pregnancy during third stage.

Post-test:

Researchers conducted a posttest on 12/5/2023 at exactly three thirty in afternoon in field of Faculty of Physical Education and Sports Sciences / Basrah University, and researchers were keen to fix all variables and conditions related to test.

Statistical method

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Presenting, Analyzing and Discussing Results. Presentation of results of Arithmetic mean, standard deviations and achievement in pre-test and posttests of research sample, analysis, and discussion:

Table 2. Shows the results of tests in pre- test and posttests for experimental group

Tests	M /Unite	Pre- Test		Post-test		T Value	T Table	Indication
		M	SD	M	SD			
Running 10 -Sec jumping	meter	50.4	0.021	58.1	0.039	3.11		sig
Running test 30 m from start flying	Sec	3.84	0.046	3.78	0.098	2.34	2.11	sig
Running 40 m from low start	Sec	4.89	0.033	4.69	0.076	2.64		sig

Under degree of freedom (16) and indication level (0.05)

Through results shown in Table (2), it became clear that re are differences between mimetically averages and standard deviations of pre-test and post-tests for three tests.

Table 3. Shows the results of tests in pre- test and posttests for control group

Tests	M /Unite	Pre- Test		Post-test		T Value	T Table	Indication
		M	SD	M	SD			
Running 10 -Sec jumping	meter	51.1	0.011	54.2	0.027	3.11		sig
Running test 30 m from start flying	Sec	3.82	0.078	3.86	0.071	2.34	2.11	sig
Running 40 m from low start	Sec	4.74	0.052	4.71	0.093	2.64		sig

Under degree of freedom (16) and indication level (0.05)

Table 4. Shows the results value of calculated experimental group (Running 10 -Sec jumping test)

Group	M /Unite	Pre- Test		Post-test		T Value	T	Indication
		M	SD	M	SD			
Experimental group	Meter	50.4	0.021	58.1	0.039	3.11	2.11	sig
Control group	Meter	51.1	0.032	56.2	0.123	2.24		sig

Under degree of freedom (16) and indication level (0.05)

Table 5. Shows the results value of calculated experimental group running (test 30 m flying start)

Group	M /Unite	Pre- Test		Post-test		T Value	T	Indication
		M	SD	M	SD			
Experimental group	Sec	3.84	0.101	3.78	0.203	2.49	2.11	sig
Control group	Sec	3.85	0.233	3.80	0.176	2.21		sig

Under degree of freedom (16) and indication level (0.05)

Table 6. Shows the results value of calculated experimental group running (Test 40 m from low start)

Group	M /Unite	Pre- Test		Post-test		T Value	T	Indication
		M	SD	M	SD			
Experimental group	Sec	4.89	0.113	4.69	0.103	2.342	2.11	sig
Control group	Sec	4.88	0.214	4.75	0.214	2.201		sig

Under degree of freedom (16) and indication level (0.05)

DISCUSSION

Researchers believe that improvement in level of achievement in experimental group came because of use of gradual rest periods between repetitions and groups, which helped to restore stability better. For internal physiological operations of working motor parties and functional devices in an organized manner, which was confirmed by Brewer (2017) who indicated that "sports training is an organized repetition to perform motor paths and make changes in building se paths and in building organs and internal devices on which training load is located With aim of upgrading level of achievement (Kraemer and Ratamess 2004**)** and researcher attributes improvement to formulation of required aim of multi -shape resistance exercises that were carried out in a clear scientific way in a manner commensurate with nature of performance, which is confirmed by (Kraemer and Fleck 2005) that in fact, essence of training planning is a planning to achieve physiological reactions to body towards any physical pregnancy on it and through body's response to achieving physiological adaptation and level of sporting performance increases, and this confirms (Tyler, 2013) who indicated that "developing training curricula for goals basic, and choice of exercises that suit nature of effectiveness in each training unit and in time term of units is one of most important criteria for success of training curriculum (Ericsson, 2014) agrees with him that "use of exercises that are consistent with nature of its performance with general form of performing specialized skills lead to better results in acquisition of strength.

Through results shown in Table (3) for control group researcher believes that the increase in the amount of muscle strength is an important factor in some sporting activities more than some other activities, as it has proven that sporting activities based on muscle capacity can improve performance and development through strength training as strength exercises increase the speed and ability of muscle contraction. This is confirmed by (Fragala et al., 2019), who indicated that "the use of rising programs with burden helps to improve motor performance using moving contracting and that the training programs designed to develop muscle strength in public muscle groups in a specific sport can be used as additional exercises complementing the regular

training program for these sports as an effective way To improve motor performance and kinetic fitness (Boyle, 2016).

Through results shown in Table (3,4,5,6), researcher attributes improvement to role of multi -shape resistance exercises that have contributed effectively to development of distinctive strength of speed and improvement of digital level of performance, which was confirmed by Herold et al., (2019), as it is necessary to use unconventional training methods that contribute In developing functional capabilities of athlete by increasing pregnancy in quantity and quality to extent that compels athlete to adapt together physically and psychologically to overcome contradiction between requirements of pregnancy and achievement of achievement (Barkley, Major & Cross, 2014). researchers also attributes se results to positive impact of proposed training program using multi -shape resistors, where it was considered that collection of exercises used is like nature of performance, as indicates that main role of qualitative exercises in various resistances lies in same path of performance and thus works on muscular groups concerned with performance (Knudson, 2013). Researchers believe a progress that proposed training program, whose contents included various exercises using various resistors to develop fitness ingredients. In addition, this progress of proposed training program, which had a positive impact for experimental group more than (classic) program that was implemented on control group, as follow -up program included training with various resistances that led to development of different physical capabilities, which in turn contribute to flowing Mark and optimal work for muscles and thus work on economy in effort and n develop level.

Conclusions

Multi-shape exercises showed a positive impact on level of achievement in two-distances 100 meters, which were represented in physical changes and achievement. Improvement rates in achievement level of physical changes and level of achievement in two groups varied, while improvement rates were better for experimental group.

Recommendations

Take advantage of the proposed training program in terms of multiple forms of resistors to develop level of achievement in activities short distances. Necessity of paying attention to developing special physical capabilities of two mourning's of short distances through use of multiple forms of resistors, because of positive impact on raising level of achievement

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Conflict of Interest

There is no personal or financial conflict of interest within the scope of the study.

The Ethics Committee

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Author Contributions

Research Design:HA , IB, AF; Statistical analysis:HA , IB, AF; Preparation of the article: HA , IB, AF; Data Collection:HA , IB, AF

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Appendix (1)
A model of multi -shape resistance exercises
First week (Saturday)/ Intensity of performance: (80 - 100 - %)

Main Department	Repetition1	Performance Time	Repetition2	Performance Time	Repetition3	Performance Time	Groups	Comfort Etween Groups	Total Time
Practice 1	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	3.60m
Practice2	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	3.60m
Practice3	3	60	4	60	3	60	2	1.30 sec	3.60 m
Practice4	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	3.60 m
Practice5	3	15	4	15	3	15	2	1.30 sec	2.30 m
Practice6	3	15 Sec	4	15 Sec	3	15 Sec	2	1.30 sec	2.30 m
Practice7	3	15	4	15	3	15	2	1.30 sec	2.30 m
Practice8	3	15 Sec	4	15 Sec	3	15 Sec	2	1.30 sec	2.30 m
Practice9	3	15 Sec	4	15 Sec	3	15 Sec	2	1.30 sec	2.30m
Practice10	3	10 Sec	4	10 Sec	3	10 Sec	2	1.30 sec	1.40 m
Total	3	60 Sec	4	60 Sec	3	60 Sec	2	1.30 sec	27.3 m

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RESEARCH ARTICLE

Predicting Hand Grip Force Based on Muscle Electromyographic Activity Using Artificial Intelligence and Neural Networks

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Abstract
This study aimed to establish predictive values for hand grip strength based on electromyographic activity while exploring disparities between measured and predicted grip strength among 12 proficient handball players. Grip strength was quantified using a specialized device recording Newton force in real-time at a 0.1-second sampling window, synchronized with muscle electromyographic activity (sEMG) recorded using the Noraxon myoMOTION technique. Various electromyographic parameters were assessed, including peak activity, root mean square, time to peak, and area under the curve. Grip strength measurements were taken at three stages (50%, 75%, 100%) and maintained for 3 seconds each. The data were analyzed using IBM Statistical software, implementing neural networks and artificial intelligence methods. The results revealed statistically insignificant differences between recorded and anticipated grip strength ($p>0.05$), indicating a high level of predictive accuracy. Minor disparities were observed, suggesting potential avenues for further investigation. This study contributes to our understanding of predictive modeling for grip strength and highlights the importance of electromyographic activity in assessing muscular performance.

Keywords
EMG, AI, Handgrip Force, Handball, Prediction Force, Neural Network

INTRODUCTION

Hand grip strength is a fundamental measure of upper extremity function and overall muscular performance. It serves as a reliable indicator of an individual's physical health, functional capacity, and quality of life across various age groups and populations (Bohannon, 2008; Leong et al., 2015; Celis-Morales et al., 2018). Moreover, grip strength has been associated with numerous health outcomes, including mortality, cardiovascular disease, and disability (Wei et al., 2023).

In recent years, electromyography (EMG) has emerged as a valuable tool for assessing muscle function and neuromuscular activation patterns during grip strength testing (Merletti et al., 2002; Mesin et al., 2011; Vieira et al., 2011). By capturing the electrical activity generated by muscle fibers, EMG provides insights into the recruitment and coordination of motor units, thereby offering a deeper understanding of muscular performance.

Additionally, advancements in EMG technology, such as high-density surface EMG and wireless EMG systems, have enhanced the precision and reliability of muscle activity measurements (Hauraix et al., 2019). Despite the extensive research on grip strength and electromyographic activity, there remains a gap in our understanding of the predictive relationship between these parameters. While previous studies

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have examined the association between muscle activation patterns and grip strength, few have sought to establish predictive models based on electromyographic data. By elucidating the underlying mechanisms driving grip strength, predictive modeling can facilitate early detection of muscle dysfunction and inform targeted interventions to optimize muscular performance.

In this study, we aim to address this gap by investigating the predictive values of hand grip strength based on electromyographic activity. Specifically, we will examine the relationship between muscle activation patterns measured via surface electromyography (sEMG) and grip strength in a cohort of proficient handball players. By leveraging advanced analytical techniques, including neural networks and artificial intelligence methods, we seek to develop robust predictive models that account for individual variations in muscle activation and strength. Our findings have the potential to inform personalized training strategies and enhance athletic performance in competitive sports settings.

MATERIALS AND METHODS

***Research Sample*:**

The research sample consisted of 12 advanced-level handball players (Table1.). Comprehensive examinations were conducted to ensure the absence of previous injuries or functional impairments in the targeted research area. Additionally, the medical records of the research sample were reviewed to confirm the absence of high blood pressure signs or abnormal indicators in both the circulatory and nervous systems (Rufo et al., 2021). The research sample comprised athletes engaged in regular training and play. This case study followed ethical standards and received approval from the Ethics Committee of Second Artillery General Hospital PLA with reference number KY2017016 and date 10/03/2022.

Table 1. Show the demographic characteristics and statistics of the participants.

Characteristic	Mean ± SD
Weight (kg)	75.6 ± 17.2
Age (years)	28.3 ± 7.2
Height (cm)	182.5 ± 8.5

Procedures

Targeted Muscles (Kunc et al., 2019).

The muscles responsible for hand movements (flexion and extension) at the wrist joint were identified as follows:

Brachioradialis

The brachioradialis is an arm muscle responsible for flexing the arm and elbow joint. It can also perform both movements: supination (turning the palm upward) and pronation (turning the palm downward), depending on the arm's position. It connects to the distant radial tuberosity of the radius bone through the brachioradial ligament and to the dorsal epicondyle above the radial notch of the humerus.

Flexor Carpi Radialis

In anatomy, this muscle in the human forearm functions to flex the hand (radially). The Latin term "carpus" refers to the wrist, indicating its role in wrist flexion.

Flexor Carpi Ulnaris

This muscle has two heads: the humeral head and the ulnar head. The humeral head originates from the medial epicondyle of the humerus via the common flexor tendon, while the ulnar head arises from the middle border of the olecranon and the upper two-thirds of the dorsal border of the ulna. The ulnar nerve and ulnar artery pass between these heads.

Extensor Carpi Radialis

It is one of the five fundamental muscles controlling wrist movement. As a long muscle, it originates from the lateral side of the forearm, attaching to the base of the second metacarpal bone. Its function involves extension at the wrist joint, moving the hand towards the thumb and away from the ulnar side.

***Extensor Carpi Ulnaris*:**

In human anatomy, this muscle is a structural muscle located on the ulnar side of the forearm. It functions in extending and adducting the wrist from the anatomical position.

Electromyographic Variables (S. Ismaeel et al., 2015).

Peak Electromyographic Activity

Defined as the highest recorded value through an EMG device, represented by the peak of the electrical wave.Measured in microvolts.

Root Mean Square (RMS)

A statistical measure used in electromyographic (EMG) analysis. Employed to measure the intensity or strength of electrical

signals recorded from muscles over a specific time period.

RMS is calculated as the square root of the mean of the squared values of the muscle's electrical signal. Measured in microvolts (Vieira et al., 2017).

$$RMS = \sqrt{\frac{1}{n(x_1^2 + x_2^2 + \cdots x_n^2)}}$$

Peak Duration (Pd)

The time interval extending from the onset to the end of EMG peak. Represents the period during which muscle electrical activity appears at its maximum strength. Measured in milliseconds (S. Ismaeel, n.d.).

Ratio of Time Change between Peak and Trough (Ratio)

A mathematical value obtained by calculating the change in time between the peak and trough of recorded electromyographic activity. Indicates the ratio of the duration of the highest peak of EMG to the duration of the lowest trough. Measured as a dimensionless ratio (Journal et al., 2020).

Mean of Peaks (MOP)

The arithmetic means of the highest EMG values. Calculated by dividing the sum of EMG values for each peak by the number of peaks. Provides an average measure of electrical activity during peak instances. Measured in the respective units of electromyographic activity.

$$MOP = \frac{p_1 + p_2 + p_3 + \cdots p_n}{n}$$

The Area Under the Curve (AUC)

The Area Under the Curve (AUC) is a measure of the enclosed area beneath a curve on a graphical plot. In the context of EMG or signal analysis for other biological activities, AUC signifies the integrated activity of the muscle over a specific time period. Typically, the curve represents the electrical activity of the muscle, and the AUC represents the total force or energy expended by the muscle during a specific timeframe.

The AUC is a valuable metric for quantifying the overall muscle activity within a given time frame. It is measured in units of microvolts × milliseconds and is often used to assess the total muscle force or energy consumption during a specific activity (Selvanayagam et al., 2012).

$$AUC = \int_a^b f(x)\,dx$$

Peak Sustain Time (Pt)

Represents the duration required for the maximum EMG to remain visible. Indicates the time the muscle maintains its peak electrical activity. Measured in milliseconds.

Peak-to-Valley Difference (Pv)

The recorded difference between the highest peak and the lowest trough of EMG. Provides a percentage difference for each recording. Reflects the dynamic changes in EMG. Expressed as a percentage.

Maximum Voluntary Contraction (MVC)

Refers to the maximum force or effort that a muscle or muscle group can generate voluntarily during a specific contraction. It serves as a measure of the maximum force or muscle output achievable by an individual in a specific context. Measured in units relevant to force or contraction strength (Jan et al., 1999).

Data Collection Tools

Hand Grip Force (HGF) measure

A device designed similar to a dynamometer was employed for measuring grip strength. This device allows data recording in multiple time windows with intervals as short as 0.1 seconds between each recording, as described by (Duque et al. 1995). The apparatus enables clear graphical representation for momentary evaluation, and it facilitates easy data export to Excel, as illustrated in Figure (1). Using the device, three attempts were given to each player, with each attempt executed at different intensities (50%, 75%, and 100%).

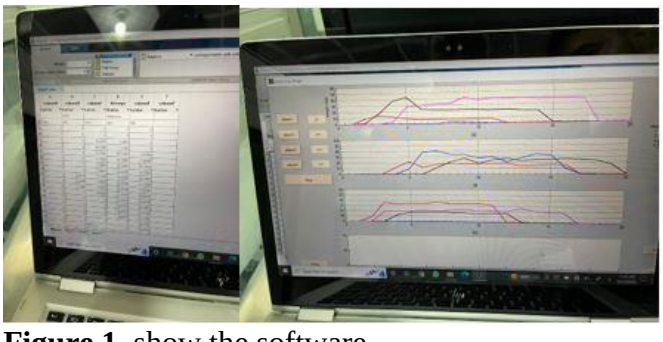

Figure 1. show the software

Stages of Applying Artificial Intelligence in the Research (Alwosheel et al., 2018)

Utilizing machine learning to estimate muscle strength based on electromyographicactivity involves several key steps

Data Collection

Begin by gathering a dataset containing electromyographic readings and accurately measured muscle strength. Comprehensive and diverse data are preferred to establish a robust and generalizable model.

Data Preparation

Preparing the data involves cleaning and formatting it for model training. This may include transforming electrical signals into variables usable as inputs for the model.

Feature Selection:

Choose important variables that the model should consider during training. This might involve analyzing the data to identify which variables have the most significant impact on electromyographic activity and muscle strength.

Data Splitting (Bonato et al., 2001)

Divide the data into two sets: one for training the model and another for testing its performance. This allows evaluating the model's ability to handle new, unseen data not used during training.

Selecting the Learning Model:

Use neural networks, statistical methods, and other suitable algorithms for addressing the estimation problem.

Model Training

Train the model using the training dataset, where it learns how to correlate electromyographic activity with muscle strength. The model aims to identify relationships and patterns in the data that can be used for predicting muscle strength.

Performance Evaluation

Test the model using the testing dataset to assess its performance and its ability to handle new data

Statistical Analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration (Tabachnick & Fidell, 2013). Neural networks were utilized to determine the relative importance of each variable, alongside leveraging artificial intelligence for predicting numerical values.

RESULTS

Table 2. Show the viriables describtion

Var.	%50		%75		%100	
	m	**±s**	**m**	**±s**	**m**	**±s**
HGF (N)	24.8	3.5	31.3	2.47	43.7	1.92
Peak (µV)	116	12.6	185	9.41	254	12.4
Rms (µV)	121	33.5	193	21.7	263	25.6
Pd (ms)	0.24	0.01	0.22	0.01	0.20	0.02
Ratio %	13	1.55	26	1.37	31	1.49
MOP (µV)	65	4.6	112	3.62	153	4.11
AUC (µV.s)	4366	238	652	341	863	541
Pt (ms)	0.98	0.08	0.64	0.07	0.56	0.049
Pv %	7.65	1.2	12.5	1.12	21.6	1.91
MVC	123	4.5	184	9.63	212	21.5

HGF hand grip force, Peak the peak of wave, Rms root mean square, Pd peak delay, Ratio of muscle power, MOP mean of peak, AUC area under curve, Pt peak time, Pv peak variance, MVC maximum voluntric contraction

Table 3. Shows the correlate among variables and HGF in 50%, 75%, and 100%.

		Peak	RMS	AUC	Pd	Ratio	MOP	MVC	Pt	Pv
50%	Pearson	0.020	0.017	0.030	0.047	0.004	0.039	0.072*	0.006	0.016
	Sig.	0.532	0.587	0.347	0.138	0.889	0.222	0.022	0.856	0.616
75%	Pearson	0.416**	0.025	0.002	0.069*	0.028	0.030	0.024	0.002	0.017
	Sig.	0.000	0.438	0.952	0.028	0.380	0.340	0.448	0.957	0.589
100%	Pearson	0.304**	0.306**	0.358**	0.230**	0.253**	0.387**	0.366**	0.358**	0.174**
	Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*P<0.05

Table 4. Model summary and it's trusted in 50%, 75% and 100%

Groups	Varibles	Intensity test		
		50%	75%	100%
Training	Sum of Squares Error	284.79	339.15	250.03
	Relative Error	0.821	1.01	0.737
Testing	Sum of Squares Error	128.34	157.48	116.38
	Relative Error	0.901	0.98	0.679

Table 5. Shows the importance of independantvariables in 50%, 75% and 100% intensity

	50%		75%		100%	
	Importance	Normalized Importance	Importance	Normalized Importance	Importance	Normalized Importance
Peak	0.433	100.0%	0.119	41.2%	0.067	35.2%
RMS	0.037	8.6%	0.128	44.2%	0.129	67.7%
AUC	0.061	14.1%	0.086	29.7%	0.023	12.2%
Pd	0.056	12.8%	0.289	100.0%	0.083	43.5%
Ratio	0.056	13.0%	0.075	25.9%	0.110	58.1%
MOP	0.094	21.7%	0.041	14.3%	0.157	82.5%
MVC	0.096	22.2%	0.109	37.6%	0.190	100.0%
Pt	0.075	17.2%	0.059	20.6%	0.156	81.9%
Pv	0.091	21.0%	0.094	32.4%	0.086	45.1%

Table 6. shows the descriptive and correlate between Handgrip Force (HGF) and Predictive Handgrip Force (P.HGF)

		N	Minimum	Maximum	Mean	Variance	skewness	Correlate	Sig.
50%	HGF	1000	12.69	36.72	24.79	12.6	0.074	0.066*	0.037
	P.HGF	1000	23.97	25.83	24.79	0.145	.208		
75%	HGF	1000	22.81	39.67	31.29	6.22	.074	0.396**	0.000
	P.HGF	1000	28.89	33.71	31.21	0.912	.043		
100%	HGF	1000	37.10	50.20	43.6951	3.763	.074	0.535**	0.000
	P.HGF	1000	39.31	48.20	43.6594	1.304	.197		

*P<0.05

DISCUSSION

Through the statistical results of the correlation coefficients between the variables of forearm muscle electrical activity during the three intensities under investigation, (Ismaeel & Fenjan, 2020), it is observed that correlation coefficients were mildly present at 50% intensity and were significant for non-maximal voluntary contractions (Wei et al., 2023). Meanwhile, there was no significant correlation between the variables and forearm muscle strength. From the same table, a noticeable increase in the correlation percentage is observed at 75% intensity, with a focus on the peak electrical activity variable and the variable of the duration of higher activity. Additionally, a significant correlation is found between all variables and forearm muscle strength at maximum intensity, suggesting that the observed changes are statistically meaningful (Clancy et al., 2005). A substantive explanation of the motor behavior of the muscle contraction being measured can provide insight into these findings (Smaeel et al., 2015). As wel as During muscle contraction, electrical signals are sent from the central nervous system (brain and spinal cord) to the muscle via nerve fibers. Although area under curve were ment the area under the electrical signal curve reflects the total electrical activity of the muscle over a specific time period (Králová et al., 2020).

Till that maximum force and time durationcan explane the maximum force of muscle contraction depends on factors such as the number of responsive motor units and the activation of muscle fibers (Wakeling et al., 2002). After the peak of electrical activity, the muscle may maintain the ability to produce force for a longer period. This endurance can be attributed to the

resilience of muscle fibers and their capacity for sustained contraction (Rufo et al., 2021).

Precise regulation of electrical activity may occur to sustain muscle force. Control over the activation of motor units and the distribution of electrical signals may contribute to this objective. In general, the prolonged maintenance of maximum force over time is explained by various factors, including the precise regulation of neural signals and the physiological properties of muscles (Forrester & Petrofsky, 2004). Neural and hormonal control, alongside the characteristics of muscle fibers, plays a crucial role in achieving this sustained force (Nema, 2022) . The emphasis on muscle tension variability in generating force parallel to the stimulus is considered a significant academic source for understanding the objective changes in muscle contraction. This can provide a scientific explanation for the quality of the contraction, interpreting the nature of muscle tissue, and addressing training, rehabilitation, or health scenarios to optimize sports performance while considering the achievement of set goals (Journal et al., 2020). Understanding the nuanced aspects of muscle contraction is crucial in tailoring interventions for training, rehabilitation, or health improvement. The variations in applied muscle tension contribute to the diversity in force production, influencing the quality of contractions. Scientific insights into the nature of muscle tissue guide how training programs, rehabilitation strategies (Duque et al., 1995), or health interventions are structured. Dealing with training involves optimizing muscle tension to enhance performance, considering the specific goals set for athletic endeavors. Rehabilitation interventions aim to restore optimal muscle function, taking into account the intricacies of muscle contraction. Health-related considerations involve maintaining or improving muscle health while aligning with broader wellness objectives (Gabriel et al., 2011).

By utilizing artificial neural network (ANN) technology and dividing the dataset into two subsets, namely the training set and the testing set, we can observe that variations in the intensity affecting the muscles of the forearm lead to changes in the statistical descriptors of the two groups. This is evident in the table above (Vieira et al., 2017). The use of artificial neural networks allows for the modeling and analysis of complex relationships within the data. The training set is employed to teach the neural network the patterns and features inherent in the data, while the testing set is used to assess the network's ability to generalize to new, unseen data (Sidek & Haja Mohideen, 2012). In the context of studying forearm muscles and their response to intensity variations, the statistical descriptors of the training and testing sets may exhibit differences due to the distinct patterns learned by the neural network during training. These differences could reflect the network's capacity to capture and adapt to the varying levels of muscle tension (Ismaeel & Fenjan, 2020). It's important to carefully analyze the specific statistical descriptors affected, as this can provide insights into how the neural network is interpreting and responding to the variations in muscle intensity.

Additionally, (Selvanayagam et al., 2012), the performance of the network on the testing set helps evaluate its generalization capabilities and ensures that it can make accurate predictions on new, unseen data beyond the training samples (Jan et al., 1999).

Building a model to predict muscle strength based on electrical activity variables can indeed provide objective insights and logical explanations (Kunc et al., 2019). However, the confidence in this model may vary with different intensities measured through it. Mathematical indicators give a clear idea by conducting statistical analysis among the three intensities to assess the reliability of the model for each intensity (Hou et al., 2007). The manuscript has demonstrated that the correlation between the recorded forearm muscle strength from the proposed device and the expected or estimated strength increases as the intensity approaches maximum (Wei et al., 2023). This can be explained by the fact that muscle fibers during contraction may provide a clearer picture of their behavior at higher intensities, as opposed to lower intensities. The model may excel in studying the timing of electrical activity at lower intensities, while the elevation in test intensity leads to a better understanding of the factors controlling the electrical recruitment of fibers (Bonato et al., 2001). In essence, the model's effectiveness may be influenced by the nature of muscle behavior at different intensities. It excels in studying electrical activity timing at lower intensities, while higher intensities provide valuable insights into the factors governing electrical recruitment of muscle fibers (Wang et al., 2021). The statistical analysis conducted

among the three intensities helps in assessing the robustness and reliability of the model across a range of muscle activities.

Conclusions

Different models are verified for each muscle contraction intensity (50%, 75%, 100%), each with its independent characteristics. The level of muscle mobilization is a fundamental principle in predicting muscle strength. Opportunity to explore the mechanisms of muscle action.

Recommendations

Classify the types of movements to be measured for strength according to intensity to achieve more logical results. Give greater importance to examining recorded strength along with expected strength simultaneously, with the option to disable self-data generation from within the application. Some variables of electromyographic activity associated with time and muscle strength need independent study based on the nature of the movement. Conduct applied field research coupled with standardized examination and evaluation devices. Low-intensity models exhibit a presence of variables related to time periods, while high-intensity models have a more pronounced presence of variables related to peak activity. There is inverse (negative) interference of some variables, providing a greater. There is a non-significant difference between the resulting and expected muscle strength using artificial neural networks.

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Conflict of Interest

We declare that this article we wrote is not involved in any conflict of interest.

Ethics Statement

The writing of this article has gone through all ethical procedures related to the academic realm. All the principles of the Declaration of Helsinki were complied, with special emphasis on informed consent and the vulnerability of the study population.

Authors Contribution

Study Design, ASM, JKA, SI and MAH; Data Collection, ASM, JKA, MAH, and SI ; Statistical Analysis, SI, JKA, MAH, and ASM; Data Interpretation ASM, JKA, MAH, and SI Manuscript Preparation, ASM, JKA, MAH, and SI; Literature Search, ASM, JKA, MAH, and SI. All authors have read and agreed to the published version of the manuscript.

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RESEARCH ARTICLE

The Effect of Six Weeks of Therapeutic Exercises and Kinesio Tape (KT) in Reducing Pain and Increasing Flexibility and Muscle Strength for People with Low Back Pain

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Abstract
Objective: This study aims to prepare therapeutic exercises that enhance the strength and elongation of ligaments and dorsal muscles, assess the impact of therapeutic exercises and Kinesio tapes (KT) in alleviating lower back pain, and evaluate the effect of therapeutic exercises and Kinesio tapes (KT) in improving flexibility and muscle strength in individuals suffering from lower back pain. **Method:** A sample of (6) injured, from Al-Kut club, (age = 30 ± 4.29 years, height = 176.6 ± 3.87 cm, mass 75.6 ± 2.71 kg) participated in the study. The participants in the experimental group (n=10) completed pre-tests and post-tests. **Results:** The results of the experimental sample show that there was a significant improvement in the mean scores for Muscular strength on the post-test compared to the pre-test. The mean score for pain decreased from (6.02 to 1.25, $p<0.005$), the mean score for the Torso force increased (flexion) from (16.17 to 51.833, (extension) 16.83 to 52.67, $p<0.005$), and the mean score for torso flexibility increased from (1.18 to 5.53, $p<0.005$). **Conclusion:** A significant finding of the study is that the therapeutic exercises employed effectively enhanced the flexibility of the torso while simultaneously restoring muscle strength. This confirms the efficacy of therapeutic exercises. Additionally, the use of Kinesio tapes appears to have a positive impact on reducing pain levels in the participants of the study

Keywords
Therapeutic Exercises, Kinesio Tape (KT), Low Back Pain

INTRODUCTION

Scientific progress, technological development, and the introduction of modern technologies have contributed to the decline in the activity of the body's vital systems and their slow functioning. Therefore, humans have become more vulnerable to many diseases and injuries due to their lifestyle (a relatively sedentary life with little movement), and among the injuries that are related to inactivity, laziness, lack of movement, and following wrong habits when Sitting or when lifting or carrying things, high effort, and poor physical fitness and body build, are injuries to the spine in general and pain in the lumbar region (lower back) in particular, as the incidence of these pains reaches one person out of every six people (Woessner et al., 2021).

The lumbar region represents weak points and movement problems for athletes and non-athletes. Given the vitality of these two regions, the occurrence of large loads and weights on them, the natural bends in them, and the occurrence of more movement activities than others in the spine, all of this leads to troubles, problems, and injuries for athletes and non-athletes. Athletes while practicing sports activities or some professions, or incorrect sitting when writing and reading, or

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misuse of modern technological devices (Bakri, 2000).

Muscle fatigue of the torso extensor muscles also plays a major role in acute and chronic low back pain (LBP). The basic physiology of fatigue is complex and not fully understood. Therefore, many physical therapists have sought to use KT because it supports damaged structures while allowing movement and at the same time may affect some of the mechanisms associated with muscle fatigue, such as blood flow and proprioception (Hasan, 2019).

Therapeutic exercises are the cornerstone of physical therapy and have positive effects on reducing pain and improving overall health, so most clinical trials have focused on studying the effects of aerobic exercise, resistance and flexibility exercises, or a combination thereof, to enhance neuromuscular control and strengthen spinal muscles, such as the multifidus and transverse abdomen, to maintain On the dynamic stability of the spine, thus reducing pain (Celenay et al., 2020).

It is worth noting that most previous studies indicated that there are positive effects left by the application of Kinesis adhesive tapes on the muscles and joints. Therefore, the researcher used them in his study in conjunction with preparing therapeutic exercises that work to quickly rehabilitate those with lower back pain and return them to practicing their normal lives while restoring their functional efficiency in the shortest time. As much time as possible to avoid complications and health problems that a person suffering from lower back pain may be exposed to (Kachanathu et al, 2014; Azab et al, 2013)

The research aims to: Preparing therapeutic exercises that strengthen and lengthen the ligaments and dorsal muscles. Identify the effect of therapeutic exercises and Kinesio tapes (KT) in reducing lower back pain. Identify the effect of therapeutic exercises and Kinesio tapes (KT) in increasing flexibility and muscle strength for people with lower back pain.

MATERIALS AND METHODS

Experimental Design

This study was based on a one-group pretest/post-test experimental design with repeated measures. When the people's injuries came to the Specialized Center for Physiotherapy and Physical Rehabilitation for the first time, their age, weight, height, BMI levels, and information about their age were recorded. Then, information was given about the core exercise practices to be applied for (6) weeks.

Participants

The participants were composed of (10) volunteers who had regularly visited the Specialized Center for Physical Therapy and Physical Rehabilitation and were experiencing lower back discomfort, aged (25-35 years). The lower back of all individuals was measured for comparison purposes. All patients underwent measurements of the affected lower back at least twice during the treatment period, pretest and posttest, and had been using Kinesio tape & rehabilitative exercise therapy as part of their rehabilitation routine for at least 8 weeks.

One participant with a lower back (10 males; see Table 1 for participant characteristics) volunteered to participate in the study and gave written informed consent for the experimental procedures. Participants had no known history of other disorders or diseases. In addition, none of the participants had engaged in any resistance training within the past 2 months. This study was approved by the University Ethics Committee No. 32/174 and dated 20/02/2023 and was accepted with the research code number and was carried out in accordance with the recommendations of the Declaration of Helsinki.

Table 1. Group characteristics

Variables	Measuring unit	X	SD	Median	Skewness
Length	Cm	176.6	3.204	176.5	0.201
Mass	Kg	75.6	3.806	76	-0.098
Age	Year	30	2.944	30	0.000
Back injury Duratio	**Day**	18.5	3.979	18.5	0.000

Mean (X), Std. Deviations (SD)

Data Collection Tools

Form for each player to record the sequence measurements

Measuring the degree of pain (see appendix 1)

The researchers prepared a scale to measure the degree of pain that includes a set of questions and phrases intended to indicate the condition of the injured person and the degree of pain he suffers from:

This scale contains 12 statements, each statement has 6 points on a scale from (0-5), so the scale ranges from (12-60). Score 12= represents the normal condition, meaning there is no pain and no injury to the back. Score 60 = represents the highest and most severe degree of pain, meaning that the back is at its worst.

Note: The lower the points, the more the patient tends towards complete recovery, and the higher the points, the worse the condition indicates and may require surgical intervention.

Measuring the back flexibility

(https://www.physio-pedia.com/Schober_Test).

Test name: Schober Test

Purpose of the test: to measure the flexibility of the lumbar region

Initial position

The tester stands upright, the therapist stands behind him, and places two marks on the back, one of which is On the fifth lumbar vertebra and the other 10 cm above it.

Description of performance

The injured person is asked to bend forward as much as possible without bending the knees.

Recording: The distance between the two marks is measured in centimetres, and more than (10 cm) expresses the degree of flexibility of this area.

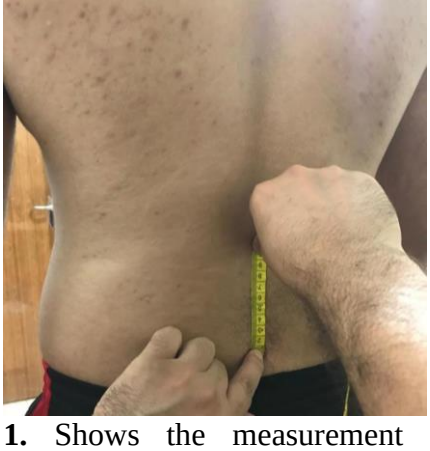

Figure 1. Shows the measurement of back flexibility

Measuring the muscle force acting on the torso (Farhat, 2007)

Measuring torso extension muscle strength

Purpose of the test: to measure the maximum strength of the muscles working on the torso.Initial position: The injured person takes a tall sitting position facing the wall or any fixed object, with the torso vertical and the feet at full extension, and the feet are fixed from the knees with a belt to prevent them from moving. The injured person wears under the shoulder area and around the chest a circular belt to which the dynamometer is attached in front of the chest and fixed to the wall or Anything fixed. Description of performance: The injured person pulls the torso forcefully backwards, and the device pointer moves equivalent to the maximum force of the muscle groups working on the torso. Recording: Three attempts, and the best reading is taken to the nearest kilometer.

Figure 2. Shows the torso extension muscle strength

Measuring torso flexor muscle strength

Purpose of the test: to measure the maximum strength of the muscles working on the torso.

Initial position

The injured person takes a sitting position, facing the wall or any fixed object, with the torso vertical and the feet at full extension. The feet are fixed at the knees with a belt to prevent them from moving. The injured person wears a circular belt under the shoulders and around the chest to which a dynamometer is attached behind the back and fixed to the wall or Anything fixed.

Description of performance

The injured person pulls the torso forcefully forward, and the device pointer moves equivalent to the maximum force of the muscle groups working on the torso.

Registration

Three attempts and the best reading is taken to the nearest kilometer.

Figure 3. Shows the strength of the torso flexors

Experimental Design

Participants were familiar with all testing and exercise protocols before starting the study. Kinesio tape applying & Rehabilitation exercises were done before and after. Therefore, the total duration of the experimental study was 8 weeks. During the rehabilitation exercises withdrawal period, the participants were asked to maintain their normal diet and physical activity levels.

Pre- measurements

Measurements and pre-tests were performed on a group of members of the experimental research sample consisting of (10) injured, at the Specialized Center for Physiotherapy and Physical Rehabilitation in Al-Kut Sports Club on Sunday corresponding to 01/03/2023.

Therapeutic exercises

The therapeutic exercises were prepared in three stages, where each stage lasted two weeks, and the total time period required to implement t20he program in practice was six weeks. The rehabilitation stages contained different exercises to suit the stage the injured person was going through, at a rate of (3) rehabilitation units per week, and the number of rehabilitation units for the injured reached over the course of Six weeks (18) rehabilitation units. The duration of the rehabilitation unit in the first stage was (45) minutes, in which various flexibility and stretching exercises were used. The first stage aimed to reduce the pain in the lumbar region and lengthen the back muscles. The number of exercises in one rehabilitation unit was... This stage ranged between (6-8) exercises. In the second stage, the time of the rehabilitation unit was (60) minutes, in which the researchers used strength and resistance exercises in which the gradual use of weights was taken into account, from easy to difficult and from simple to complex, in addition to movement exercises with Take into account the gradient load in the exercise. Resistance exercises aim to strengthen the muscles that have been weakened as a result of the injury. They also aim to improve the range of motion and the spacing of the vertebrae from each other. Resistance exercises vary, either by resisting body weight, gravity, rubber bands, or an external weight.

As for the third stage, its time became (75) minutes and aims to get rid of pain completely and restore the endurance necessary for daily performance. The focus in this stage was on special exercises to raise the level of general physical fitness and exercises for strength, resistance and stability. It is noteworthy that the rehabilitation program was applied to all individuals. The sample is individually, not collectively.

Applying medical patches

The researcher placed medical tape (KT) on the lumbar area in the lower back, in accordance with medically approved conditions, from the first day of the injury until the pain disappeared completely. The tape continued to be placed for three days, the tape was removed on the fourth day, and the process was repeated periodically until the end of the rehabilitation program. It is noteworthy that there are more than 16 colors, with no difference in the effect between one color and another (Hassan, 2018)

Steps to install Kineso adhesive strips (Al-Jawad, 2016)

First

Shaving and trimming the hair in the affected area because some men with thick hair must shave the area before fixation to increase the tape's adhesion to the skin.

Second

Clean the skin with warm water and soap, because this helps the tape stick better.

Third

Disinfect the area with disinfectant liquid, provided that the percentage is alcohol it contains more than 76% to remove pollution and dust on the skin to give the tape the opportunity to contact the skin well.

Fourth

Use a warm pillow to increase pressure on the tape adhering to the skin to increase the strength of adhesion between it and the body.

Figure 4. Shows the installation of Kinesio strips

Post-measurements

Post-measurements and tests were conducted on the group of individuals of the experimental research sample on 20/4/2023 in the same order as the pre-measurements and under the same conditions, for each patient separately.

Statistical Analysis

SPSS package program was used in the statistical analysis of our research. It was determined by the normality distribution and skewness coefficients of the data. Significance level was determined as P 0.05 and all data were presented as mean standard deviation (SD) unless stated otherwise. Independent samples t-test was used to compare the scores obtained from the measurements according to categorical variables.

RESULTS

For patients participating in rehabilitation exercises at 8 weeks, no injury was recorded at any stage of the exercises, and no adverse events (both acute and chronic) were reported for anyone doing the exercise.

Table 2. Mean scores and standard deviations of the experimental group on the Pre-Test and Post-Test for degree of pain.

Measurements	Pre-test		Post-test		Arithmetic mean of difference	T value	Improvement rate%
Degree of Pain	X	SD	X	SD	4.77	.182	83.41
	6.02	0.68	1.25	0.48			

p < (0.05), Arithmetic mean (X), Standard Deviation (SD)

The data presePnted in Table (2) clearly indicate significant differences between the pre-measurement and post-measurement in the degree of pain. The post-measurement showed a higher level of improvement, with a T value of 18.2, which exceeds the critical T value at the 0.05 level. The percentage of improvement was calculated to be 83.41%.

Table 3. Importance of the disparities between the first and final measurements in the variable of torso flexibility.

Measurements	**Pre- measurements**		**Post- measurements**		**Arithmetic mean of difference**	**T value**	**Improvement rate%**
	X	SD	X	SD			
Torso flexion force (kg)	16.17	1.94	51.833	2.14	35.663	27.64	68.80
Torso extension force (kg)	16.83	0.75	52.67	1.966	35.84	38.20	68.04
Torso flexibility (cm)	1.18	0.19	5.53	0.50	4.35	18.12	78.66

p < (0.05), Arithmetic mean (X), Standard Deviation (SD)

It is clear from Table (2) of the differences between the pre-measurement and the post-measurement in the torso flexibility variable that there are significant differences between the two measurements at the 0.05 level and in favor of the post-measurement, as the t-value reached (18.12) and this value is greater than the tabulated t-value at the 0.05 level, and the improvement percentage was 78.66.

It is clear from Table (3) regarding the differences between the pre-measurement and the post-measurement in the strength of flexion and extension of the torso that there are significant differences between the two measurements at the 0.05 level and in favor of the post-measurement, where the t-value reached (27.64) and (38.2) and this value is greater than the tabulated t-value at the 0.05 level. The improvement rate was between (68.80-68.04).

DISCUSSION

Table (2) demonstrates statistically significant disparities between the pre-and post-test in the variable degree of pain, suggesting the beneficial impact of adhesive tapes and rehabilitative exercises. The researcher's implementation of therapeutic exercises and the application of Kinesio adhesive tapes significantly contributed to the reduction of pain levels, resulting in an improvement observed in the average pain measures before and after the intervention.

The application of Kinesio adhesive strips significantly decreased pain intensity in the lower back muscles, as evidenced by a study conducted by González-Iglesias the study concluded that the use of Kinesio adhesive strips resulted in an immediate 23% reduction in pain intensity (González-Iglesiasm, 2009). This enabled the injured athlete to engage in his activities with evident ease and devoid of discomfort, so enhancing the afflicted individual's muscle capacity required for strength and flexibility training. The credit for this is attributed to the utilization of Kinesio adhesive tapes, as previously mentioned. These tapes possess the unique quality of matching the thickness and specifications of the skin. They function by lifting the skin, thereby reducing pain. Moreover, Kinesio adhesive tapes promote blood circulation, which has a beneficial impact on muscle physiology. The results align with the conclusions of previous studies conducted by Hasan & Hasan, Oliveria, Murray,, Additionally, a study by Kaya, Zinnuroglu, & Tugcu, demonstrated that the use of Kinesio adhesive strips had a notable effect in reducing pain and inflammation in the injured sample. The study shown that employing Kinesio adhesive strips is a viable alternative for addressing injuries, particularly when an immediate impact is required (Hasan and Hasan, 2022; R. Oliveria, 2005; Murray, 2000; Kaya et al, 2010).

The data presented in Table (3) indicates that there are statistically significant disparities between the pre- and post-measurements, with the post-measurement showing greater torso flexibility factors. The researcher credits the enhancement to the utilization of adhesive tapes (kt) in conjunction with rehabilitative activities. This approach effectively augments the range of motion and flexibility in the back by providing support to the back muscles. Utilizing taping techniques and incorporating flexibility and stretching exercises to enhance the flexibility and expand the range of motion of the muscles in the back. This is congruent with what was stated by (Yoshida & Kahanov, 2007; Halseth & McChesney, 2004), which asserts that the application of adhesive tapes (kt) delivers stability and support to the muscles and minimizes the degree of pain when completing various flexibility exercises. . This aligns with the findings of (Omran, 1998; Hasan & Matty, 2024), which suggest that the increase in range of motion can be attributed to the beneficial effects of stretching and standardized flexibility exercises. Additionally, this improvement is accompanied by a reduction in discomfort levels and an enhancement in muscular strength.

Table (3) demonstrates statistically significant variations between the pre- and post-measurements, favoring the post-measurement in terms of muscular strength. The researcher credits the improvement to the specific set of therapeutic exercises that were chosen, as they played a significant role in enhancing muscular strength. Additionally, the researcher applied Kinesio adhesive strips to the affected muscles, which provided crucial support and stability during rehabilitation exercises. This reduced pain in the affected limb, enabling the injured individual to perform the exercises confidently and without hesitation.

These findings align with the assertions made by (Kosra and Hassanin, 2000; Hasan, 2023; Hasan, 2018; Matty, 2021), that enhancing muscle strength results in the growth of active muscle mass, fortification of connective tissues and the skeletal system, and enhancement of body composition. Consequently, muscle strength training is recommended in various programs. Rehabilitation promotes angiogenesis, resulting in enhanced arterial blood pressure inside the muscle,

increased muscle fiber density, and heightened mitochondrial content in the muscle (Hasan & Awed, 2024).

Conclusions

The available data strongly support the use of Rehabilitation exercises that positively improve the flexibility of the torso to reach the range of motion simultaneously with the restoration of muscle strength, which confirms the effectiveness of therapeutic exercises. There appears to be a positive effect of Kinesio tapes in reducing the degree of pain in the study sample, by supporting and establishing the muscles in the lower back.

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Conflict of interest

No conflict of interest is declared by the authors. In addition, no financial support was received.

Ethics Committee

No. 22/162 and date 02/12/2023 was accepted with the research code number and was carried out according to the recommendations of the Declaration of Helsinki

Author Contributions

Study Design, BB, LS; Data Collection, BB; Statistical Analysis, BB, LS; Data Interpretation, BB, LS; Manuscript Preparation, BB, LS; Literature Search, BB, LS. All authors have read and agreed to the published version of the manuscript.

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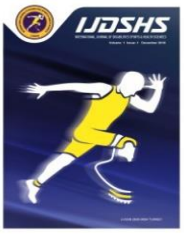

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RESEARCH ARTICLE

The Effect of Special Exercises Using the Visual Stimuli Device on the Speed of Motor Response, Visual Tracking, the Skills of Cutting and Dispersing the Ball, and Various Defensive Movements for Young Handball Players

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Abstract
The research is significant because it aims to improve the speed of motor response and visual tracking through targeted exercises using the visual stimuli device that the two researchers created as part of the training program for the sample. This program also supports the individual defensive movements of the players, which are exemplified by the skills of cutting and dispersing the ball and other defensive movements for young handball players. Preparing unique workouts with visual stimuli to enhance young handball players' motor reaction speed, visual tracking abilities, ball-cutting and ball-dispersing capabilities, and defensive maneuvers is one of the research's goals. *The methodology*: researchers have used experimental methods with two groups. The research population was purposefully selected and sampled; specifically, the goalkeepers, who numbered two, were omitted, and the Diyala Handball Club youth players for the 2022–2023 sports season numbered eighteen. *As a result*, the sample size increased to sixteen participants, split into eight players representing the experimental group and eight representing the control group at random (even and odd numbers). After conducting an exploratory experiment on two handball players. *The research concludes* that workouts on the visual stimulus device positively impacted the experimental study sample's development of visual tracking and motor reaction speed.

Keywords
Specıal Exercıse, Vısual Stımulı, Motor Response, Vısual Trachıng.

INTRODUCTION

Handball is one of the games characterized by varied and variable motor performance in defense and attack. This nature of Performance requires high physical, motor, and visual abilities, which requires the central nervous system to be present not only for the response to performance situations to be correct and accurate but also for these situations to be characterized by speed and accuracy in Performance to overcome the competitor (Bonnet et al., 2020).

Since the sense of sight is one of the most important senses with which we perceive the world around us, it is a sense of perception (Howes & Classen, 2013). A behavioral tool and an integrated interaction process, a person sees a thing, perceives it, analyzes it, and has a feeling toward it (Hollan et al., 2000). Therefore, the handball player needs to have good visual abilities, including visual tracking of the movement of the attacking player and the ball, as it helps in making changes and responses of the players and thus their awareness during individual defensive movements (Alfailakawi, 2016). as well as using them during their Performance during various defensive movements and to cut, disperse or take possession of the ball due to the speed of handling and receiving. For the ball between attacking players

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(Forcher et al., 2022). The player must be able to move quickly and follow the player's movement, the direction of the ball, and its change according to the playing situations during the match to possess visual abilities (Castagna et al., 2003). Therefore,the faster the Performance increases, the greater the need for these abilities (Carling et al., 2008). The American Ophthalmology Association stated that visual vision depends on several visual abilities and identified them with fifteen diverse visual abilities (Grossman et al., 2017). they included visual tracking, which is important in players' individual and collective defensive movements in creating changes (Alfailakawi, 2016).

Since defensive skills are no less important than offensive skills in handball, Some even consider it the basis of competition that determines the level and ranking of teams (Ferrari, 2021). The handball player often performs his defensive movements, right and left, and rushes forward at full speed to carry out the defensive cover process (Wedelstaedt & Meyer, 2017). All of these movements require the defensive player to have high physical abilities, such as speed of movement and compatibility of the legs, as well as the members of his body, to perform his defensive duty in the best possible way so he is obliged to follow changes in the attack of the opposing team, which requires a high degree of rapid response to the movement of the attacking players and the ball (Venzke et al., 2023). Specialists have confirmed that defense is more difficult than attack, especially if we consider the match's final result, as a mistake in defense means scoring a goal against the team by the opponent. In contrast, a mistake in attack means losing the ball (Johnston & Morrison, 2016).

The research aims to improve the speed of motor response and visual tracking through specific exercises using the visual stimuli device the researchers designed within the training curriculum for the sample. This supports both the individual defensive movements and the motor performance of the player, as demonstrated by the skills of cutting and dispersing the ball and defensive movements. The research topic was refined by the two researchers' combined experiences in the academic and professional domains, expert consultations with handball training professionals, and exercise follow-up. The players' delayed movement and reaction to the ball's movement were noted as a problem in their defensive play, which might be related to a visual impairment. However, the quickness of the motor response to the striker's and the ball's movements, as well as the players' disinterest in training programs. Handball players struggle with a lack of resources and tools that can help them improve their physical and visual skills, which are among the fundamental building blocks of visual efficiency (Campher, 2008).

The necessity to employ various techniques increases with the game's complexity or speed of play to create the instrument (Adams & Dormans, 2012). One of the sports where the defensive player must always keep an eye on the attacker's movements and the ball's movement is handball (Alhosseini et al., 2015). The player's ability to cut and distribute the ball and perform other defensive maneuvers in handball will be positively impacted by the visual aspect's high efficiency (Gogoi & Pant, 2017). One of the research's goals is to prepare unique workouts with visual stimuli to enhance young handball players' motor reaction speed, visual tracking, ball-cutting and ball-dispersing skills, and defensive maneuvers. Also, learn how visual stimulus workouts affect young handball players' defensive maneuvers, visual tracking, cutting and ball-dispersing skills, and motor response speed. According to the research hypothesis, practicing with the visual stimulus device helps the young handball players in the research sample improve their speed of motor reaction, visual tracking, ball-cutting and ball-dispersing abilities, and defensive maneuvers.

MATERIALS AND METHODS

Participants

The researchers used the experimental method with two equal designing experimental and control groups with pre-and post-tests to implement the study. The sample of the study was determined and sampled intentionally, namely the Diyala Handball Club youth players, who numbered (16) players without goalkeepers. Thus, the number of the divided into two groups, experimental and control, with (8) players for each group. Prior to beginning the exercises, the researchers compared parity between the experimental and control groups in the variables examined, as well as homogeneity in the growth

variables (Length, mass, chronological age, and training age).

Participants were included in the trial only if they were in a clinically stable state with no history of illness or worsening of respiratory symptoms, no medication alterations within the preceding two months, and no clinical signs of edema. Patients with evidence of cardiovascular, osteoarticular, or other terminal cancers, inability to consent or cooperate, long-term home oxygen therapy, active tuberculosis or other infectious disorders, as well as stroke were excluded. The study was approved by the Institutional Review Board (IRB) of the University of Babylon in Iraq (date of approval on first of April 2020). All experimental procedures regarding testing, lower torso training, and respiratory training by devices were carefully explained to the participants and written informed consent from participants who met the inclusion criteria was obtained before the beginning of the experiment. Thus, the study was conducted in accordance with the Declaration of Helsinki. Table (1) (2) shows the homogeneity and equivalence of the sample, as shown below.

Table 1. shows the sample specifications according to length, mass, chronological age, and training age.

Variables	Measuring unit	Mean	Std. Deviation	Skew ness
Length	Cm	171.312	3.439	0.269-
Mass	Kg	68.8000	2.465	0.551
Age	Year	17.781	0.729	0.595
Chronological age	Month	42.6	4.728	-0.186

Table 2. shows the results of the equality of the research sample in the variables investigated

Variables	Experimental group		Control group		Means Difference	SD Difference	Calculated t value	Error level	Sig type
	X	SD	X	SD					
Visual Tracking	51.000	4.750	50.000	4.629	1.000	6.803	0.416	0.690	Non-Sig
Speed Motor Response	10.875	3.090	10.000	3.664	0.875	6.379	0.388	0.710	Non-Sig
Cutting And Dispersing The Ball	2.875	0.834	2.750	0.462	0.125	0.991	0.357	0.732	Non-Sig
Various Defensive Movements	18.036	1.348	18.165	1.071	0.128	1.114	327	0.753	Non-Sig

*Significant at significance ≥ 0.05, Mean (X), Std. Deviation (SD)

The calculated (t) values achieved an error greater than the significance level (0.05), indicating the randomness of the differences and the equality of the two research groups in all research variables. This confirms the randomness of the differences in the (t) test results between the experimental and control groups, as shown in Table (2) above. The researchers spoke with experts and professionals in handball and sports training to determine the research variables. They also analyzed several Arab and international sources that addressed the topic of this visual capacity and individual defensive skills in handball. Following the collection and analysis of the surveys, a set of tests was created to evaluate visual tracking, ball-cutting and dispersal skills, defensive maneuvers, and their testing. It was ascertained by combining defensive maneuvers, ball-cutting and ball-dispersing techniques, and visual tracking testing with the Vienna Test System. These tests are scientific, accurate, and codified and are defined by scientific foundations

of honesty, consistency, and impartiality, as they have been employed in comparable studies. The suitable assessments for the talents under investigation were, in turn.

First: Test the response speed. Which consists of testing short-term defensive movements (front, back, side) (Otoom et al., 2019).

Second: Visual tracking test. The Vienna test system carries out the testing (Ong, 2015).

Third: Individual defensive skills in handball.

Various defensive movements: Test name: Cutting and dispersing the ball between two handball attack players (Marzouk & Shabib, 2023).

Table 3. shows the values of the arithmetic means, their deviations

Cutting and scattering the ball. Test name: Cutting and scattering the ball between two handball attack players (Young & Murray, 2017).

The researchers adopted the tests, which received an 80% rating from the experts' choice. After that, the researchers conducted exploratory experiments on (2) players from the research sample. Special exercises were created using the visual stimuli device that the researchers designed as part of the training program for the sample to improve the speed of motor response and visual tracking. These exercises support the player's motor performance and individual defensive movements, exemplified by the skills of cutting and dispersing the ball and other defensive movements for young handball players.

The training section is 3 times a week for 8 weeks applied. Duration for each training season is between 90-120 minutes with high intensity (%90 – %92) half time spent with researchers and others with club couch.On Wednesday and Thursday, which correspond to 16–17/2/2023, the researchers pre-tested the research group on the Diyala Sports Club handball court. At exactly 10:30 Am. The experimental group underwent the experiment at the start of the main training unit section and received three training units each week for eight weeks, or a total of twenty-four training units. Following the training program's installation, the researchers utilized the software to administer post-tests to the two groups under the same temporal and geographical settings as the pre-tests.

Statistical Analysis

To investigate intervention induced between and within-group changes, Statistical Tool. For the study researchers used the SPSS software. Mean (M) and standard division (SD) has been used for statistical analysis.

RESULTS

Table 3. Shows the values of the arithmetic means, their deviations, and the significance of the differences between the pre-and post-tests for the variables investigated for the experimental and control Groups

Variables	Groups	Experimental group		Control group		Means difference	SD difference	T-value	Error level	Sig type
		X	SD	X	SD					
Visual Tracking	Experimental	10.875	3.090	14.875	0.991	4.000	2.777	4.073	0.005	Sig
	Control	10.000	3.664	12.000	3.023	2.000	1.603	3.340	0.010	Sig
Speed Motor Response	Experimental	51.000	4.750	56.750	3.654	5.750	3.535	4.600	0.002	Sig
	Control	50.000	4.629	54.500	3.703	4.500	2.203	5.775	0.001	Sig
Cutting And Dispersing The Ball	Experimental	2.875	0.834	6.000	1.069	3.125	0.991	8.919	0.000	Sig
	Control	2.750	0.462	4.875	1.125	2.125	0.991	6.065	0.001	Sig
Various Defensive Movements	Experimental	18.036	1.348	13.771	1.033	4.265	0.883	13.651	0.000	Sig
	Control	18.165	1.071	15.136	0.950	0.811	0.286	10.563	0.000	Sig

*Significant at significance ≥ 0.05, Mean (X), Std. Deviation (SD)

Table 4. shows the significance of the differences between the post-tests of the investigated variables

Variables	Experimental group		Control group		Means difference	Std. Deviation difference	Calculated t value	Error level	Sig type
	X	SD	X	SD					
Visual Tracking	14.875	0.991	12.000	3.023	2.875	3.356	2.422	0.046	Sig
Speed Motor Response	58.625	1.922	54.500	3.703	4.125	3.136	3.720	0.007	Sig
Cutting And Dispersing The Ball	6.000	1.069	4.875	1.125	1.125	0.991	3.211	0.015	Sig
Various Defensive Movements	13.771	1.033	15.136	0.950	1.365	1.322	2.919	0.022	Sig

*Significant at level ≥ 0.05, Mean (X), Std. Deviation (SD)

Figure 1. During training

Figure 2. The device used in the research

DISCUSSION

The tables above' results demonstrate that, for the two tests (speed of motor response and visual tracking), there are notable differences between the pre-and post-tests and the experimental and control groups, with the experimental group's post-tests showing a significant advantage. The researchers attribute this development to the effect of exercises on using the visual stimuli device, which effectively contributed to the development of Variables (response speed and visual tracking). Defensive play requires speed in responding to the attacker's movement. Therefore his movements must be characterized by a purposeful mechanism performed in quick, short, successive and precise steps, aiming to prevent the attacker from acquiring offensive motor features that help implement the offensive vision for him and his team. Defense is not limited to preventing the attacker from hitting the goal with a goal. Still, it has other positive functions and goals as well, including trying to gain possession of the ball to begin the stages and operations of the attack, this is confirmed by (Ferrari, 2021)that defense is a preparation stage for the attack, which consists of quickly switching to defense as soon as the team's players lose the ball.

The exercises that the researchers prepared using a visual stimuli device and with shots to different places and directions responded to the stimulus, as the handball player often performs his defensive movements right and left and rushes forward at full speed to carry out the process of defensive coverage or cutting and scattering the ball to prevent the attacker from shooting. All of these movements require the player, the defender, must have a degree of speed and coordination of the legs and eyes, as well as the members of his body, to perform his defensive duty in the best way and to follow the changes in the attack of the opposing team, which requires a high degree of motor response speed (Vila & Ferragut, 2019; Zapardiel Cortés et al., 2017). Confirm that the speed of motor response is the most important type of speed necessary for players in handball, and this appears when he blocks balls aimed at the goal at a speed better than the speed of the ball, especially from the near shooting area or balls.

The game of handball is one of the games that has witnessed great development at the level of the countries of the world and has begun to spread rapidly because it contains technical skills and various plans that are interesting for the

viewer, it can be considered one of the games that work to spread the spirit of cooperation and unify efforts to reach the high sporting level (García et al., 2013). Therefore, the researchers were keen that the exercises include diversity in style in terms of the tools used and the directions and distances in which the players move according to the visual stimuli and repetitions to spread the spirit of competition and the desire to perform the exercise, which helped to learn and train these skills quickly (Lilić et al., 2020). Using modern methods, innovation, and diversification in educational units contributes to learning defensive skills (Ferrari et al., 2019). The study (Cottrell et al., 2014) also indicates that (diversifying the units so that for every unit or two, the trainer changes the style or method so that the learner does not feel bored and fed up, which is reflected in skill performance). The development that occurred in the visual tracking variable in the post-tests of the experimental sample compared to the control resulted from the use of modern means and tools, including the designed visual stimulation device, which worked to develop visual tracking in the experimental research sample. To vary from the typical workouts, considering the significance of using contemporary technology and tools in training, Researchers have suggested that it is important to transition from old training techniques and technologies to more contemporary ones during the training process (Cottrell et al., 2014; Türkistanli, 2024).

Using contemporary instruments and gadgets helps people concentrate more on performing, learning, and improving abilities, as well as "the great diversity in performing skills, which works to improve Performance (Schmidt & Wrisberg, 2008). The researchers believe that developing visual abilities is very important in the game of handball, in addition to physical abilities and motor skills, as it is characterized by the movements of attacking players and the ball in multiple directions, which requires mastering various defensive movements by handball players, This is what was confirmed by (Ion & Silviu, 2019) that (athletic Performance in general includes two aspects: the motor and the visual, and if the visual aspect does not work well, this negatively affects the Performance of the motor and skill aspect). Also, ideal Performance is linked to visual abilities, and this has been confirmed by (Chukhlantseva, 2023) (Visual abilities are important in sports, whether individual or team, as they require focus and attention). Accordingly, one of the tasks of the defensive player is to Visual tracking of the ball and player, which relies on eye movements to scan the playing area and track the ball in flight some studies, including the study (van Donkelaar & Staub, 2000) have indicated that the extent of eye movement in visual tracking is greater when it is not moved with the hand movement. Therefore, any weakness in these visual abilities causes disability and poor Performance with the loss of the appropriate timing to cut and disperse the ball or to obtain it.

The tables mentioned above (3, 4) also demonstrated significant differences in favor of the experimental group's post-tests in the two tests (cutting and dispersing the ball, various defensive movements) and between the pre-and post-tests for the experimental and control groups. The researchers believe that using the stimulant gadget in certain activities has resulted in this development. Visual contributed effectively to developing my skills (cutting and dispersing the ball, various defensive movements) through various exercises that serve defensive skills and are similar to skill performance in terms of tools and the diversity of the exercises themselves. This was indicated by (Kraemer & Ratamess, 2004) (Preparing the exercises through the training program according to the similarity to the competition, the diversity in the exercises, and the differences in their implementation with different repetitions works to master these skills). More favorable outcomes for the experimental group were obtained because the exercises used were designed to improve the visual skill represented by visual tracking in a scientific and codified manner and acquire physical abilities, such as the speed of motor reaction and its growth. More than the conventional curriculum that the control group used.

The researchers believe that the player's movements and motor skills in defense must be appropriate to the requirements and circumstances of competitions and awareness of different situations, which allows for quick perception of what the opponent intends to do so that the player can determine the accuracy and speed of judging special cases and emergency circumstances, ensuring the speed of the player's correct responses through The defense process faces tactical changes, which requires the use of his previous

experience (McPherson, 1993) states, "It is necessary to master the defense process and train in it, because in it it is possible to block a goal and score a goal, while in attack it is possible to score a goal. The team becomes a defender when it loses control of the ball, as it becomes its duty to quickly switch to a defensive state. The players begin trying to regain control of the ball by the player who lost the ball or the closest other defender to prevent the attacker from handling or shooting and allow the rest of the defending players to cover. A quick return to the defense area and organizing their ranks because failure to defend leads to scoring a goal. Therefore, it is necessary to pay attention to training for the speed of performing defensive movements in handball, as it is no less important than the attack and is the basis for repelling the opposing team's attack and starting a counterattack.

For the player to be able to move in all directions continuously, the defender must have good physical abilities, in addition to the requirements for good Performance to hinder opponents, limit their movements, and gain possession of the ball through various defensive movements (Gréhaigne et al., 2005). as (researchers believe that the nature of defensive movements in handball in training and matches requires speed and high physical fitness to enable the player to move to the side, backward, and forward high, and continuously, it must be the defender has the ability and ability to investigate correctly, and through this he can hinder opponents, reduce their danger, and prevent them from scoring. As a result, this has led to the player defending his goal with proper timing and speed, as the distance between the attacking player and the goal is very close.

Conclusions

The experimental group's members' motor response time and visual tracking improved due to the workouts on the visual stimulus device. The visual stimulation exercises positively impacted the experimental group members' individual defensive skills (ball dispersal and cutting, as well as other defensive maneuvers). For the control group, traditional exercises improved motor reaction time, visual tracking, and individual defensive skills (ball dispersal and cutting, among other defensive maneuvers). The experimental group performed better than the control group in the visual stimuli device exercises to improve their motor response speed, visual tracking, and individual defensive skills (such as cutting and dispersing the ball and other defensive movements). The visual stimulus device workouts improved the participants' motor response time and visual tracking, which had a favorable and substantial impact on each player's defensive abilities (ball dispersal and cutting, among other defensive maneuvers) in the experimental group.

Recommendations

Investing in exercises with a visual stimuli device designed to develop skill performance and physical and visual abilities to raise the efficiency of handball players. Working to find tests for visual abilities for defensive and offensive skills in handball**.** The need to pay attention to other physical, skill and visual abilities by preparing special exercises and different methods and devices to increase excitement and suspense among male and female handball players. Conduct similar studies and research on different age groups and other handball skills.

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The Ethics Committee

This article's necessary ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 12.02.2024 Issue/Decision No: 2024/10.

Conflict of Interest

The authors declare no conflict of interest. In addition, no financial support was received.

Author Contributions

Study Design, WKM and LASJ; Data Collection, LASJ; Statistical Analysis, WKM and LASJ; Data Interpretation, WKM and LASJ; Manuscript Preparation, LASJ ; Literature Search, WKM, and LASJ. All authors have read and agreed to the published version of the manuscript.

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RESEARCH ARTICLE

The Effect of using the Programmed Teaching Method According to Linear Programming in Teaching the Skills of (Put Down and Shooting) Football Among High School Students

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Abstract
The study aimed to reveal the effect of using programmed instruction in teaching the skills of (put down and shooting) in football to high school students. The researcher used the experimental method for its suitability and the nature of the research. The research sample included fourth-year students in the Martyr Abdul Rahman Preparatory School for Boys in the Kirkuk Governorate Center for the academic year. (2022-2023) and their number was (333) students. The research sample was (25) students for each group, as the experimental group studied with the programmed education method according to linear programming, and the control group studied with the traditional (imperative) method, and the period of implementation of the educational program was (6) weeks, with two units per week, where the duration of the educational unit was (40) minutes, and the researcher conducted a reconnaissance experiment and after the introductory unit, the researcher conducted the main experiment of applying the educational units, and then conducted the post-test, then the data was treated statistically, and the researcher concluded that teaching According to programmed instruction according to linear programming, it was better than the traditional method in terms of having a positive impact on high school students in teaching the skills (put down and shooting) in soccer.

Keywords
Programmed Teaching, Put Down Skill İn Football, Shooting Skill İn Football, High School

INTRODUCTION

Modern educational trends emphasize the necessity of keeping pace with the rapid pace of cognitive development. The teacher must continue to search and investigate modern methods, strategies and methods that enable him to deliver scientific material to the minds of his students with high efficiency to achieve his educational goals, in which the learner, the method, the content and the goal are important elements in the educational process, while the teacher is a guide and guide. Those who follow the educational process realize the necessity of introducing diversity into teaching methods, and it is necessary for the teacher's choices to vary in learning methods so that he does not stop at one specific strategy or method because applying a unified strategy and method for all learners may not lead to correct learning during teaching (Baio et al., 2018).

Points out indicates that "education is a process of mutual interaction between teachers and learners with the aim of providing learners with the required information and skills that should be achieved within a specific period of time. In order to enhance learners' learning, the diversity of methods used affects the speed of achieving the goals of the educational process, which are mastery and consistency of performance, as well as taking into account individual differences among learners"

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(Barakat, 2019). Therefore, teachers must find methods that suit each of the nature of the learners, the teaching environment and the topics, taking into account the individual differences between the learners. (Mahasneh, 2015) , points out that it is necessary for the teacher's choices to vary in learning methods so as not to stop at one strategy. In particular, because applying a unified strategy for not all learners may lead to correct learning. In order to achieve effective education that all modern educational systems seek, it has been shown that the method of programmed education according to linear programming (Rashid & Neamah, 2022).

The learner follows this method of education in a straight line, where the educational material is divided into small frames. They are arranged in a sequential order. In each frame, the learner needs to provide a response of a specific type and obtain immediate feedback and appropriate reinforcement. The learner cannot move to the next frame before he provides a correct response to the content of the current frame (Mahasneh, 2015). Teaching soccer skills, including the skills of (putting down and shooting) depends (Zghair & Kadhum, 2022) . To a great extent, the application of the appropriate teaching method and style that helps learners master performance, and thus organize their studies more effectively, which is the goal that the educational process seeks, has been used in the current research procedures, as the interest in effective teaching methods in order to deliver the scientific material and learn it in an economical way is It is a vital matter, as the teacher plays an important role in providing an environment for learning mathematical skills to create a type of intelligent learning of skills (Muhalhal & Neamah , 2023).

Therefore, we can say that this learning enhances the work of education. From here, we can summarize the importance of this research in using the programmed teaching method according to linear programming and its impact in teaching the skills of (put down and shooting) at the top of the ball among minutes school students and diagnosing their weaknesses to improve the effectiveness of their teaching.

Through examining the studies and research, the researcher noticed the diversity of teaching methods that suit all categories of learners in schools, and that the old, traditional methods in the education process are prevalent in teaching, in consisted of fourth-grade students at Martyr Abdullah Abdul Rahman Minutes School for Boys, addition to the increase in individual differences among learners in schools that no longer help in confronting the obstacles that arise. They face them, which the learner does not know is a passive recipient only because the traditional method is the method of displaying the skill, as the students stand for a while until it is their turn to participate in performing the motor task that is required to be performed, and not exchanging ideas in teaching football skills, away from positive interaction in the educational situation. This is not consistent with the philosophy.

Educational education that focuses on making the learner the focus of the educational process, especially since football skills in general make the student interesting to perform. If the researcher believes that many changes must be made in the educational field, the most important of which is the shift from teaching to learning and from focusing on the teacher to focusing on The learner, from unorganized planning to planning in an organized manner, from the (methodological) textbook to multiple learning sources, and from collective learning to individual learning (Ahmad, 2016).

From here, the research problem crystallized for the researcher and called for the need to use and be of assistance to other strategies and methods in achieving A better educational and learning environment and improving accelerated learning through the use of a programmed teaching method according to linear programming in teaching the skills (put down and shooting) of the ball among minutes school students. Research objectives: Preparing educational units using the method of programmed instruction according to linear programming in teaching the skills of (putting down and shooting) football among minutes school students, and detecting the effect of using the programmed teaching method according to linear programming in teaching the skills of (putting down and shooting) football among minutes school students.

MATERIALS AND METHODS

The researcher used the experimental method because it suits the nature of the research problem, because the experimental method is one of the best research methods in solving practical educational problems. The research population
in the Kirkuk Governorate Center for the academic year 2022/2023. They were chosen intentionally

and their number reached (333) students distributed among (6) academic divisions. As for the research sample, it consisted of (25) students from Section A who were randomly selected and divided into two experimental and control groups. (25) Students represented the experimental group and (25) students represented the control group. The experimental group was subjected to the use of the experimental variable (Programmed teaching method according to linear programming. As for the control group, they used the usual method (traditional).

This article's necessary ethics committee permissions were obtained with University of Baghdad Social Sciences for Woman Ethics Committee Commission Date: 20.02.2023 Issue/Decision No:4/153. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

The researcher excluded a number of students from the two research groups (6), namely: deferred students. Table (1) shows this.

Table 1. Shows the number of members of the research sample

No.	Groups	Number of students	Teaching strategy
1	Experimental	25	Programmed teaching method (according to linear programming)
2	Control	25	Traditional learning
	Total		50

Experimental design used in the research

An experimental design called an equal groups design with a post-test was used, and it is considered one of the best experimental designs

Table 2. shows the experimental design used in the research

No.	Groups	Pre-test	Independent variable	Post-test	Compare results
1	Experimental	Skills (put down and shooting) with football	Programmed teaching method according to linear programming	Skills (put down and shooting) with football	Pre-post
2	Control	Skills (put down and shooting) with football	The method followed	Skills (put down and shooting) with football	Pre-post

In order to identify the homogeneity of the individuals in the research sample and to control the variables that may affect the results of the experiment, including individual differences and the homogeneity of the sample in growth variables, the variables concerned with the research study (height, age, weight), the researcher sought to extract indicators of descriptive statistics in order to control the sample specifications. By calculating the value of the skewness coefficient in order to obtain sample homogeneity and Table (3) shows this.

Table 3. Shows the homogeneity of the research sample for the control and experimental research groups

Groups	Variables	Measuring unit	X	Median	SD	Skewness
Experimental	Length	Cm	157.53	158	3.566	0.76
	Mass	Kg	60.73	60	5.22	0.11
	Age	Year	16.36	15.000	1.271	0.447
Control	Length	Cm	158.61	159	3.876	0.66
	Mass	Kg	62.33	61	4.86	0.10
	Age	Year	16.36	15.000	1.271	0.447

Mean (X), Standard Deviation (SD)

It turns out that the skewness coefficient was limited to (±1), which indicates the homogeneity of the research sample in terms of age, height, and mas from the table above.

Table 4. shows the equality of the experimental and control research samples.

No.	Variables	Measuring unit	Control		Experimental		T value	Type sig
			X	SD	X	SD		
1	Put down	Degree	1.400	0.615	1.000	0.714	1.753	Non sig
2	Shooting	Degree	1.000	0.718	1.300	0.632	0.714	Non sig

Arithmetic mean (X), Standard Deviation (SD)

The results in the table above showed that the calculated value of (T) is greater than the value of the error level (0.05), which means that the differences are not significant between the two groups, which indicates that the two groups are equal, and these indicators are considered solid scientific statistical evidence for the pre-test.

Determine the tests used in the research

Through the researcher's knowledge and survey of sources and studies related to skills tests, a questionnaire was prepared containing a set of tests, which was presented to experts and specialists in the field of football. After collecting the forms and transcribing the data, one test for each skill was accepted, meaning three tests were accepted through Percentage: The test that received an agreement rate of (70%) from the experts was accepted (Al-Azzawi, 1991).

Table 5. Shows the percentage of skill tests according to experts' opinio

No.	Skill	Candidate tests	Expert approval	%
1	Put down	1- Put the ball rolling on the ground.	1	%
		2- Put the ball inside the foot while it is in the air.	1	%
		3- Put out the parked ball from a distance of 10m inside a square (2m x 2m).	1	%
2	Shooting	1- Shooting towards a goal divided into squares from a distance of 20 metres	0	%0
		2- Shooting towards three overlapping rectangles, and the distance between the starting line and the rectangles is 10 m	1	%
		3- Shooting from a distance of 12 metres	6	%

Description of skill tests

First: put down test (Al-Zyoud and Alyan, 2005)

Test name: ***Putting the ball in a square (2m x 2m)***

The purpose of the test: to measure the level of performance of the skill of suppressing the ball, regaining control of it by the side of the foot, the foot, the thigh, or the chest. ***Tools used***:(5) legal footballs, adhesive tape for planning, a whistle, and a measuring tape. ***Method of performance***: The layout of the test area as shown in Figure (9). The player stands behind the test area with the ball on the line and after giving the start signal, kicks the ball (a high ball to the player by a fellow player from a distance of 10 meters from the test area) who advances from Starting line to the test area (2m x 2m), trying to stop the ball with any part of his body except the arms, and then returning to the starting line. Thus, the player repeats the attempt (5) times

in a row and the ball must be stopped behind the line within the specified area. For the test, one foot must be inside the test area. If the teacher (colleague) makes a mistake in throwing the ball, the attempt will be repeated and it will not be counted.

Registration

Two marks are given for each correct attempt. The player is given a zero if the attempt is unsuccessful. (10) marks are given for the total of five attempts

Directions

The ball will be kicked with the foot from the bottom to the top, and the attempt will be considered a failure in the following cases: If the player does not succeed in stopping the ball. If it crosses any of the lines of the test area. If he stops the ball illegally in football.

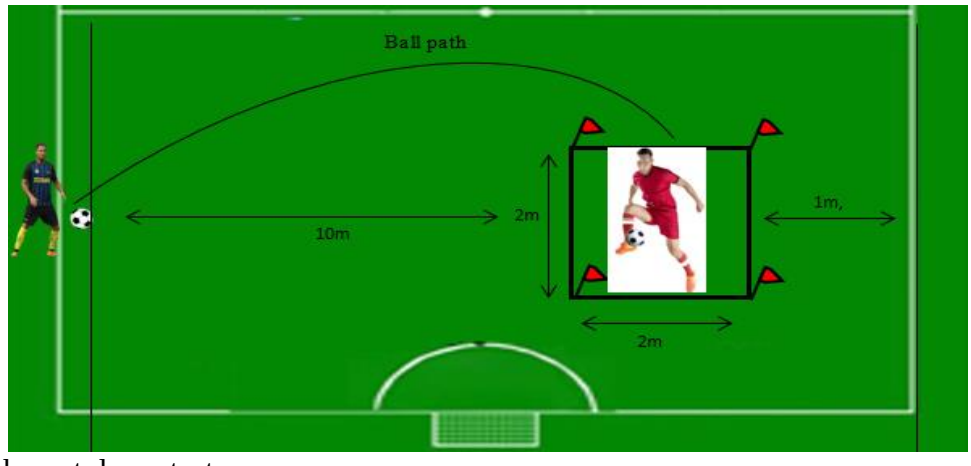

Figure 1. Shows the put down test

Test name: 12 m shooting test (Al-Zyoud and Alyan, 2005)

Purpose of the test: shooting accuracy.

Tools: a futsal goal, (10) futsal balls, and a whistle.

Test description: A futsal goal divided into (6) equal parts and distributed as follows: the upper two corners (4) degrees, the lower (3) degrees, the lower minutes part (1) degrees, the upper minutes part (2) degrees, and a line with a width of (2m) is 12m away from the target, as in Figure (7).

Method of performance: The student stands behind the shooting line and has (5) balls on the line in front of her. Upon hearing the signal, she hits the balls placed on the line to the goal, then she hits the other five balls after they are placed in their place by the work team, and so on until the student completes (10) attempt.

Test conditions

The student hits the ball with her favorite foot. Do not change the position of the balls placed on the line before shooting. Registration: (10) attempts are counted and the total score recorded in the attempts is counted, the highest score being (17).

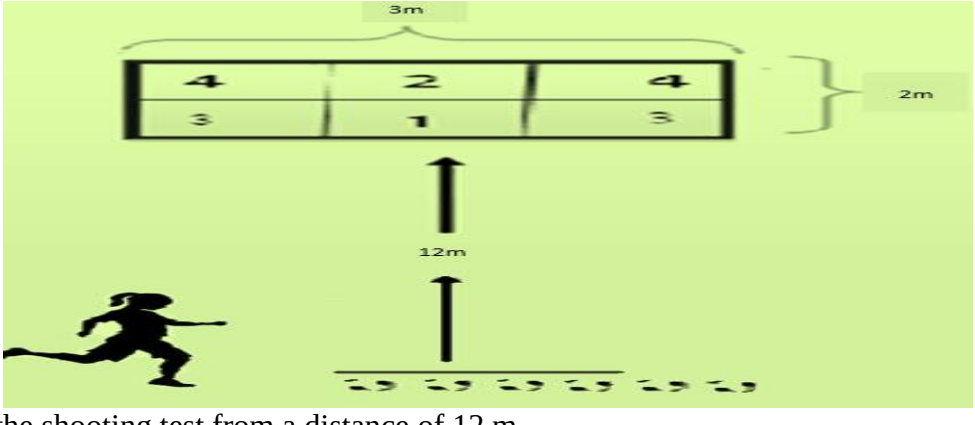

Figure 2. Shows the shooting test from a distance of 12 m

Exploratory experiment

The exploratory experiment for skill tests was conducted on a sample of (10) students from Division C, from within the research community, and the researcher and subject teacher supervised the study on Thursday, 3/2/2023. The aim of this exploratory experiment was as follows:

Knowing the obstacles and problems that may hinder the work of the field experiment. Ensure the safety of the devices and tools used. Verifying the scientific foundations of skill tests. Identify the time taken for the test. Basic research experience

Pre-test

The researcher conducted pre-tests on a sample of the two research groups (experimental and control) on Thursday, 3/9/2023 AD. Football skill tests were applied after preparing the forms for each student's name and for each test according to the nature of recording each student's data to facilitate the work and record the results that it is obtained by every student. The researcher worked to establish all the conditions related to the tests, such as the place, method of implementation and work, as much as possible, creating the same conditions for the post-tests.

Preparing educational units using the programmed teaching method according to linear programming

After reviewing many modern scientific sources and references in the field of methods of teaching physical education and specialized books, the researcher prepared educational units programmed teaching method according to linear programming through a booklet programmed in football for students in the skills (put down and shooting) by analyzing it into small, supported parts. With illustrations for each educational step in a manner that ranges from easy to difficult, taking into account the content in terms of time, in order to achieve the research objectives through each student viewing the educational material designated for the programmed teaching method, which is the special questions about the put down skill, through papers placed on the trip. Each comes A student watches the content of the assigned questions about put down, then begins to answer yes or no, and after that he confirms the correct answer. The student does not move to the next educational unit until after passing the first educational unit. In the event of not passing the question, the student gets immediate feedback by viewing the correct answer then answer a new question again.

Post-tests

The post-tests were conducted on Thursday (April 13, 2023) in the Sports and School Activity Directorate, and the researcher made sure that the conditions were similar to the pre-tests in terms of place, time, and the presence of the assistant work team, and with the same steps as the pre-tests.

Statistical Analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration (Tabachnick & Fidell, 2013). Independent Samples T-test and One-Way Anova were used in the analysis of normally distributed data; Kruskal Wallis H-test and Mann Whitney U-test were used in the analysis of non-normally distributed data. Among the scales used in our research, parametric tests were performed because the kurtosis-skewness values of Sport Participation Motivation, Harmony in Life and Contentment with Life Assessment were between ±1,5. Since the Psychological Well-being scale was not between ±1,5, nonparametric tests were applied.

RESULTS

Table 6. Shows the pre- and post-measurement values for members of the control group for the variables of the skills (put down and shooting)

Variables	Measuring unit	Pre-test		Post-test		T value	Level sig
		X	SD	X	SD		
Put down	Degree	1.400	0.615	3.700	1.588	2.343	0.035
Shooting	Degree	1.000	0.718	2.325	1.435	4.406	0.000

Arithmetic mean (X), Standard Deviation (SD)

Table 7. Shows the pre- and post-measurement values for members of the experimental group for the skill variables (put down and shooting

Variables	Measuring unit	Pre-test		Post-test		T value	Level sig
		X	SD	X	SD		
Put down	Degree	1.000	0.714	3.900	0.354	6.738	0.000
Shooting	Degree	1.300	0.632	3.800	0.622	7.342	0.000

Arithmetic mean (X), Standard Deviation (SD)

Table 8. Shows the differences in the post-test between the control and experimental groups in the variables (put down and shooting)

Variables	Measuring unit	Control		Experimental		T value Calculated	Level sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Put down	Degree	3.700	1.588	3.900	0.354	3.653	0.002
Shooting	Degree	2.325	1.435	3.800	0.622	2.123	0.042

Arithmetic mean (X), Standard Deviation (SD)

DISCUSSION

It is clear from Tables (6, 7, 8) that the two methods achieved the learning goals, especially in teaching the skills (put down and correcting). believes "that one of the natural phenomena of the education process is that there must be development in education as long as the teacher follows the correct basic steps for teaching and correct performance. The focus on continuous attempts and repetitions until performance is mastered and consistent" (Ghada, 2008; Hussein, et al., 2023) , in addition to the nature of sports work that requires continuous interaction between students and their cooperation together, gives clarity about the extent of their awareness and awareness in implementing what is required of them (Rashid & Neamah, 2022), but there were statistically significant differences between the pre- and post-tests in favor of the experimental group that used the method of programmed instruction according to linear programming. It helped students learn and master skills because programmed instruction has a role in the interaction that takes place between the learner and the educational program, so the effectiveness of the educational program helped increase The desire, excitement, and improvement of the educational process among students, and the multiplicity of questions, tools, and materials used by the teacher work to improve the educational process and raise the effectiveness of learning for the student, and this is what was confirmed by (programmed education in which learners move from one framework to another in the same order, but Each learner works at his own pace, and the material must be prepared and prepared in a special way and presented in an image (Al-Diwan, 2009). Obtaining knowledge results from personal experiences, experience, and practice, and is linked to the individual's mental processes, his method of perception, and his motivation (Zghair & Kadhum, 2022), and that the gradation in education from easy to difficult and taking into account individual differences influenced the experimental group that used programmed instruction according to linear programming in teaching the skills of (put down and shooting) in football to minutes school students and brought about development in their learning as it is one of the successful methods in building The correct ideas for teaching, which are based on the ideas accumulated as a result of watching, practicing, and displaying the successful model, performing different movements quickly (Al-Zyoud & Alyan , 2005). We find that limited compatibility in the multiple functions of the different thought centers is one of the factors that contribute significantly to, in addition to the role of the exercises and games included in the units. Educational due to its special nature and diversity, whether it is practiced with tools or without tools, or it is performed individually, in pairs, or in groups, it provides students with the appropriate opportunity to express their desires and inclinations, in addition to the pleasure they gain through practicing it (Rashid & Neamah, 2022; Majed, 2022).

Conclusions

Using the programmed teaching method according to linear programming is more effective than the traditional method (the usual method) in teaching the skills of (put down and shooting) in football to minutes school students.

Recommendations

Applying the programmed learning method is one of the modern methods in education and teaching to increase the number of learners in classrooms, which helps to utilize time, save effort, and raise the skill level of learners. Applying the programmed teaching method to complex and more difficult skills due to its positive effect on improving and speeding up the learners' learning of motor skills and enriching the learners' cognitive and emotional aspects. More research and studies should be conducted that apply different teaching methods for the purpose of raising the efficiency of the educational process when teaching, teaching and training scientific and practical subjects in schools.

Conflict of Interest

The author declare no conflict of interest.

Ethics Committee

This study was performed by adhering to the Helsinki Declaration. Ethical approval of the study was obtained from Ministry of Education, Iraq Ethics Committee at the board meeting dated 20.02.2023 and numbered No:4/153

Author Contributions

Plans by author: study design,by Amenah Study Design,; Data Collection, AK, OB; Statistical Analysis,; Data Interpretation, Manuscript Preparation,; Literature Search, . the author have read and agreed to the published version of the manuscript.

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Appendix (1) A model of an educational unit for the put down skill

- Stage: Fourth preparatory school
- Group number: 25 students
- Goal: learn to put down
- Unit time: 40 minutes

No.	Unit sections	Time	Details of the educational unit vocabulary
1	Preparatory section	5minutes	A general warm-up of the body and skill-specific physical exercises.
2	Main section	30 minutes	
	Educational section	10 minutes	- General information about the put down skill and its importance, explaining the technical performance of the skill, and mentioning the most common mistakes in it to avoid.
	applied section	20 minutes 15minutes	- Showing pictures and illustrations of the put down skill to students.
		5minutes	
3	Final section	5minutes	Calming and relaxing exercises for the body

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RESEARCH ARTICLE

The Effect of the Murder Strategy on Learning Passing and Receiving in Handball for First-Year Intermediate Students

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Abstract
The purpose of this paper is to prepare educational units according to the Murder strategy to learn the skill of passing and receiving the handball and to identify its effect for the students of the first intermediate grade. The researchers assumed that there is an effect of the educational units according to the Murder strategy in learning the skill of passing and receiving the handball for the students, and there are statistically significant differences in favor of the experimental group. The researchers used the experimental method in the manner of two equal groups. The researchers identified the population as students from Al-Baladhuri Intermediate School, one of the schools of the Diyala Education Directorate for the academic year 2023-2024, who numbered (564) students for all grades in it. The researchers chose the sample intentionally, represented by first-grade students. Their percentage was (15.95%) (who numbered (90) students) , and the research sample was determined from Division (A) so that the number of the sample was (45) students, at a rate of (50%) of the total students in the first grade, in a deliberate manner. The sample was divided into an experimental group and a control group, represented by (20) students for each. A group and (5) students for the exploratory experiment. The study concluded that using the Murder strategy has a direct and significant impact on students learning the skill of passing and receiving the handball for students.

Keywords
Murder Strategy , Passing And Receiving , Handball

INTRODUCTION

The amazing progress and development of educational institutions witnessed by sports science in sports may exceed imagination, and through the strategies that some institutions have been able to reach learners to capabilities and limits that in the recent past were something of distant goals, it is nothing but the result of the creativity of human minds, teachers, coaches, scientists, and professors. In addition, experts. Physical education is an important field of education in that it prepares the student and provides him with multiple experiences and skills that meet the students' needs, inclinations and desires. Given what characterizes our world today
his mission to the fullest extent, and through this research into strategies for teaching physical in terms of a major technological revolution and rapid development in all different areas of life, attention must be given to kinetic learning and its various theories and methods as Topics directly related to learning kinetic skills (**Rashid, 2004**). Despite the progress achieved in various fields, teaching strategies and methods are still traditional, and do not meet the needs of the learner. Today's teacher is still the same teacher as yesterday, using traditional strategies, methods and methods in the process of delivering the material to the learner, but we all hope that we will rise (**Suhad, 2020**). In the field of developing the strategies used by the teacher as the leader, guide, and mentor of the educational process so that he is able to carry out his responsibility and carry out
education, it is a study of the student in his skill aspects, and the teacher, the subject, and the

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strategy participate in educating the students and directing them (Shaker, Tuama, & Radhi, 2022). The correct view is that they are the mainstay of the future and the basis for developing the educational process, and handball is an exciting and enjoyable group game for both practitioners and spectators, and this enjoyment that the game brings to everyone requires those interested in it to keep up with everything new so that it can be used to supplement this game to parallel the development it has achieved in popularity. By increasing the number of spectators and practitioners in school tournaments in addition to local matches and tournaments within the educational institutions affiliated with each governorate, the importance of research and coming up with the idea of implementing experiments in the field of specialization comes, which has been demonstrated by finding the best strategies used in developing and pushing this game forward in our country. This importance is in identifying the effect of the Murder strategy in learning passing and receiving with handball for students (**Hashem et al. 2022**).

Researchers in the field of education and physical education emphasize the necessity of using multiple types of physical education teaching methods to develop the level of learning among students, "because learning is a natural process for humans, but it is complex and requires a lot of study and analysis" (**Rashid, 2004**). Teaching strategies in their broadest sense are nothing more than A thoughtful preparation of the steps necessary for the learning process, as they are closely related to the elements of the curriculum and have a mutual influence that cannot be separated from them, and since the teaching process is flexible in its origins and contains several activities carried out by the teacher in order to help students reach the educational goals, and it is also a means to achieve the goal of learning, therefore The researcher decided to conduct a study for the purpose of knowing the effect of the Murder strategy in learning to handle and receive handball for students.

Identifying the effect of the Murder strategy on learning to handle and receive handball among members of the research sample.

There are statistically significant differences between the pre- and post-tests and in favor of the post-tests for members of the experimental and control groups in learning to handle and receive handball.

There are statistically significant differences between the experimental and control groups in the post-tests, in favor of the experimental group in learning to handle and receive the handball.

MATERIALS AND METHODS

The researchers used the experimental method in the manner of equal groups, which is considered one of the most efficient means of achieving reliable knowledge. As shown in Table (1) "The experimental method is an attempt to control all the basic factors except one variable, which is manipulated in a specific way so that it is It is possible to establish and measure this manipulation." (**Mahjoub, 1993**).

This article's necessary ethics committee permissions were obtained with University of Baghdad Social Sciences Ethics Committee Commission Date: 12.02.2024 Issue/Decision No: 2024/13. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki , and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

Table 1. Shows the experimental design

Groups	first step	first	Skill	The fourth step	Step five
	Pre -test	Independent variable	Post - test		
Experimental group	Handling and receiving skill	Murder strategy	Handling and receiving skill	The difference between the pre- and post-tests for the two groups	The difference between the two groups in the post - test
Control group		The method used by the teacher			

Community and sample research

"The goals that the researcher sets for his research and the procedures he uses will determine the nature of the chosen sample" (**Khuraibet , 1988**).

The researchers defined the research population as first-grade students in Al-Baladhuri Intermediate School, one of the schools of the Diyala Education Directorate for the academic year 2023-2024, who numbered (124) students. The researchers chose the sample randomly from a portion of the first-grade students, who numbered (25) students and their percentage was (22.58%). The sample was divided into an experimental group and a control group, represented by (12) students for each group and (6) students for the exploratory experiment.

Homogeneity and equality of the research sample

Table 2. shows the statistical parameters of the variables of height - weight – age

Variables	Mean	Std. Deviations	Median	Skewness (±3)
Length – cm	147,76	5,72	146	0,923
Weight - kg	58,92	6,34	57	0,908
Age - year	12,23	1,39	12	0,496

From Table (2) it was found that the values of the skewness coefficient were all limited to (+1). Then the researchers conducted the equivalence of the sample with the pre-test for the two research groups, the control and the experimental, in the skill of passing and receiving the handball, as in the table below

Table 3. shows the equivalence of the skill test used

Groups		Measuring Unit	Mean	Standard deviation	T value Calculated	Error percentage
Passing and receiving	Experimental	(time/second()	10,794	1,775	0,713	0,294
	Control		11,413	2,142		

The tabular value of T in front of degrees of freedom (38) and at percentage error (0.05) is equal to 2.01

From Table (3), it was found that the significance of the differences is not significant. This indicates that the two groups are equivalent in the level of performance of the skill of passing and receiving in handball.

The means, tools and devices used in the research

Arabic sources and references, testing and measurement, the International Information Network (the Internet), the statistical analysis program SPSS, a form for emptying data, a handball court, legal balls (5), whistles (1).

Test is under investigation

Passing and receiving the ball **(**Al-Khayyat , and Al-Hayali, 2001**)**

Test name:- (Passing and receiving on the wall within 30 seconds)

Objective of the test: - Measure the speed of the player's repetition of passing and receiving the ball.

Method of performance: - The player stands (3 or 4 meters) away from the wall and holds a handball in his hand. Upon hearing the signal, he throws the ball at the wall and then picks it up again. He continues throwing the ball at the wall until the specified time expires, which is (30 seconds).

Tools and capabilities: - An indoor handball court, handball, and a stopwatch.

Registration method : Each player scores the number of times the ball touches the wall during the specified time, the player is given only one attempt.

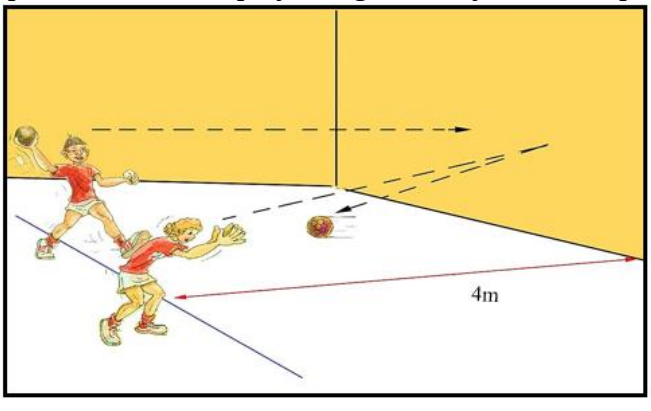

Figure 1. Shows the passing and receiving test within 30 seconds

Field research procedures:

Exploratory experience

Conducting the experiment in which the researcher explores the ability and validity of the tools, work team, and tests used to help him in the experiment. "The exploratory experiment is a mini-experiment of the basic experiment, and it must meet the conditions and conditions in which the basic experiment takes place as much as possible so that it can be implemented." (Abdel-Jabbar and Ahmed, 1987). Accordingly, the two researchers conducted their initial exploratory experiment on Sunday, October 8, 2023, on a sample consisting of (6 players) who were randomly selected and are a sample of the research community.

The researcher conducted this experiment to find out the following matters

Ensure the validity of devices and tools while conducting the pre-test of the research.

Ensure the validity of the test and its suitability to the sample.

Identify the time taken by the test used.

Scientific foundations of the skill under research

After processing the data statistically by using the simple correlation coefficient (Pearson), it was found that all skills have a high degree of stability, as shown in Table (4).

Table 4. shows the reliability coefficient of the skills test

Test	Reliability coefficient	Type sig
Passing and receiving	0,88	Sig

Table (4) shows the reliability coefficient for the handball passing and receiving test. It was shown that the calculated value of the test is greater than the tabulated value, which indicates that the test results have high stability.

Pre-tests of the research sample

Pre-tests for the research sample were conducted for the experimental and control groups on Sunday, 15/15/2023, in Al-Baladhuri Middle School.

Main experience

The first educational unit, Appendix (1), a model of the educational unit for the experimental group, was conducted on Monday, October 16, 2023, and the last educational unit was conducted on Monday, December 25, 2023. As for the control group, the teacher used his usual method.

Post-tests

The researchers conducted the post-tests after completing the application of the educational units to the experimental group, which amounted to (8) educational units, on Wednesday (12/27/2023) in the Al-Baladhuri Middle School playground, taking into account all the conditions, conditions and procedures under which the pre-tests were conducted.

Statistical Analysis

SPSS package program was used in the statistical analysis of our research. It was determined by the normality distribution and skewness coefficients of the data. Significance level was determined as P 0.05 and all data were presented as mean standard deviation (SD) unless stated otherwise. Independent samples t-test was used to compare the scores obtained from the measurements according to categorical variables.

RESULTS

Presenting, analyzing and discussing the results of the differences between the pre-test and post-test for the skill of passing and receiving the handball for the experimental group

Table 5. shows the results of the experimental group for the skill test

Test	Measuring unit	Pre-test		Post-test		T value calculated	Level Sig	Type Sig
		Mean	standard deviation	Mean	standard deviation			
Passing and receiving	1/100sec	33,4	3,49	35,6	3,24	7,86	0,001	sig

Presenting, analyzing and discussing the results of the differences between the pre-test and post-test for the skill of passing and receiving the handball for the control group.

Table 6. shows the results of the control group for the skill test

Test	Measuring unit	Pre-test		Post-test		T value calculated	Level Sig	Type Sig
		Mean	standard deviation	Mean	standard deviation			
Passing and receiving	1/100sec	29,5	5,57	30,11	4,45	0,61	0,000	sig

The tabular (t) value is (2.20) with an error rate of (0.05) and a degree of freedom (11)

The researchers attribute the reasons for the Presenting, analyzing and discussing the results of the post-tests for the experimental and control groups.

Table 7. shows the results of the experimental and control groups for the skills post-test used.

Variables	Groups	Arithmetic means	Standard deviations	T value	level sig	Type sig
Passing and receiving	Experimental	56,35	3,24	5,08	0,001	Sig
	Control	11,30	4,35			

The tabular (t) value is (2.20) with an error rate of (0.05) and a degree of freedom (22)

DISCUSSION

Differences and results of the pre- and post-tests of the experimental group to the effect of the educational units designed according to the Murder strategy for learning the skill of passing and receiving with the handball, and the Murder strategy has a large and effective role in learning and developing the skill, “because the steps of the Murder strategy allow the learner to create a meaningful understanding by linking Previous knowledge and integrating it with what has been learned, as these steps begin by presenting a real problem faced by students and then working on analyzing it and finding appropriate solutions to it through the knowledge and skills that are acquired” (Mahmoud, 2008).

The researchers see the significant differences achieved by the control group between the pre- and post-tests in the research variable, and this is realistic because the method, whatever type, that the subject teacher follows, certainly has a positive role in students’ learning and developing their level of handball passing and receiving skills, even if this method is dependent on the teacher. More than the student. “The bottom line is that the role of the student is repetition and practice, that is, the teacher gives the ideas and topics complete and ready for the students, and they do not have to explain and analyze, but rather apply and practice to master the skill to be learned. This is what "confirms when the learner faces a problem or situation, learning occurs" (Zaitoun 2007; Hashem, Al Edhary, Radhi, & Hmeid, 2022).

The researchers attribute these results to the effectiveness and impact of the educational units designed according to the Murder strategy used by the experimental group, which helped it outperform the control group. The use of this strategy in its basic stages has an effective and significant positive impact on the development of the level of learning of the experimental research sample because of the new capabilities it provides. The learner can benefit from it. The skill of passing and receiving is one of the basic skills on which the game of handball is based, and through the units used, the researcher relied on its implementation to be effective in improving the accuracy of directing the ball and receiving it accurately, as it plays a prominent role in raising the level of skill performance for sports competition in the game of handball. Based on this, the improvement in accuracy reflected positively on the speed of passing and receiving by creating muscular and nervous coordination of the muscles working for the skills required to be implemented, including the skill of passing and receiving within 30 seconds. “Stimulating and recruiting the largest number of working muscles used for the required work, in addition to the role these muscles play in resisting players to repeatedly perform strong and fast movements and preventing a drop in their level if they are repeated for the longest period during sports competition.” (Rashid , 2004; Hashem et al. 2022).

The frequent success of maneuvers in the mini-playground and awareness of the appropriate distance between the student and his colleague helped in learning. "Awareness of the distance during maneuvers has an important role in the speed of learning and mastering the skill" (Dayem and Hassanein, 1984).

Conclusions

Through the above presentation, analysis and discussion of the results, the researchers reached the following conclusions:

The results of the arithmetic means of the experimental group in the pre- and post-tests proved that there are differences in favor of the post-tests. The method used by the teacher helped in learning the skill of passing and receiving the handball under study among members of the control group. The Murder strategy has a positive impact on learning the skill of passing and receiving handball, for the benefit of the sample of individuals in the experimental group. The educational units and skill exercises in the main section, designed according to the Murder strategy, had a positive impact on learning the skill aspect of the skill of passing and receiving handball, which is better than the method approved in school. The results and differences obtained by the experimental group and their superiority over the results of the control group are clear evidence of the success of the use of the Murder strategy by the experimental group.

Recommendation

Based on the above-mentioned conclusions reached by the researchers, the following is recommended:

Using the Murder strategy to learn other skills and other sports games, as this strategy is a modern teaching method. Conduct other similar studies using the Murder strategy on samples of different genders, such as female students. Need to pay attention to using the Murder strategy and encourage those in charge of the educational process to develop their educational and training capabilities. Conducting studies to compare the Murder strategy with other strategies in teaching handball skills. Emphasizing the use of modern models, methods, strategies and methods in physical education lessons and moving away from the traditional methods and methods used.

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Conflict of Interest

There is no personal or financial conflict of interest within the scope of the study.

Ethics Statement

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Author Contributions

Study Design, K.Y.H.; Data Collection, M. K.J.; Statistical Analysis, M. K.J; Data Interpretation, MM and K.Y.H; Manuscript Preparation, M. K.J. and K.Y.H; Literature Search, K.Y.H, and M. K.J. All authors have read and agreed to the published version of the manuscript.

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Appendix (1)

A model of educational units for learning the skill of passing and receiving
According to Murder's strategy first month
Passing and receiving skill with handball
Unit/first
Week: first, Day and date // 20, Time: (45) minutes
Educational objectives:
- Accustoming students to discipline and commitment.
- Spreading the spirit of cooperation among students.
- Spreading the spirit of competition among students.

Educational objectives:
- Learn the skill of passing and receiving

Type of activity	Time in minutes	Educational goal	performance	Organization	Notes			
					repetition	Rest in between		Total performance time
						repetition	Exercises	
Preparatory part	5minute	Warm up Physical exercises	Running and arm movements	**********	33	3	2	10 minute
The main part 30minute	5minute 25minute	Educational activity Applied activity	- Performingpassing and receiving from a . stationary position - Performingpassing and receiving the handball from outside . the forbidden area - Running from the center line to the front of the goal, taking the ,ball from the ground passingand receiving .with the handball - Ball and numbers exercise (each student carries a specific number in his group. A ball is placed in front of each group . The teacher calls out a specific number. The student runs quickly and catches the ball, then handles and receives the handball from outside the nine-.meter zone line		3 2 2 2 1	30 seconds 30 seconds 1 minute 30 seconds 30 seconds	30 seconds 30 seconds 2 minute 1 minute	4.5 minute minuted 7 minute 5.5 minute 5 minute
Concluding part 5minute	10minute		Small game Dismissing					

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RESEARCH ARTICLE

The Impact of Aquatic Rehabilitation Exercises on Improving Motor Abilities In Spastic Paralysis Patients Aged (6-8) Years

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Abstract
The researchers aim to address the rehabilitation of children with simple spastic cerebral palsy, emphasizing the importance of early intervention for faster and better rehabilitation. The study also aims to develop exercises and use an aquatic environment for the rehabilitation of children aged 6-8 years with simple spastic cerebral palsy, assessing the impact of aquatic exercises on the rehabilitation and motor abilities of this age group. The research sample, consisting of five individuals with simple spastic cerebral palsy, was purposively selected from the Happiness Institute for Physically Disabled Individuals in Baghdad. The researchers ensured homogeneity in variables such as height, weight, age, and severity of the condition to establish a common starting point for the intervention. The researchers condensed their findings into an aquatic therapy method, believing in the scientific and field capabilities of individuals, provided there is access to modern information, devices, and advanced means, conducting scientific experiments to enhance the effectiveness of the beneficiaries. The significance of the research lies in the rehabilitation of individuals with spastic cerebral palsy, aiming to save time and effort and increase motivation for faster, better, more advanced, and enjoyable rehabilitation for them. The designated place for treatment at the Happiness Institute for Physically Disabled Individuals with Simple Spastic Cerebral Palsy is for children aged 6-8 years, specifically males.

Keywords
Aquatic Rehabilitation Exercises , Improving Motor Abilities , Spastic Paralysis Patients

INTRODUCTION

The focus on childhood is of paramount importance, considering that a child is a being in need of care to perform daily and vital tasks. They can be involved in various activities through their interaction with the surrounding environment, play, movement, and participation with peers. Numerous diseases, including cerebral palsy, make the child unable to move naturally.

"Cerebral palsy" is a condition affecting children, a term referring to a child whose natural brain development is hindered due to incomplete growth or damage to cells in areas responsible for movement, posture, and balance during their natural growth phase (Obeid, 1999). The researchers reviewed several studies related to the topic under investigation. For instance (Subhan, 2007) explored the relationship between cerebral palsy and the performance of certain motor skills in children, using a descriptive approach in his study. The study concluded that the muscle groups working in children were weak. Another study by (Ibrahim, 1999) focused on the impact of rehabilitation exercises using a space suit, revealing that the rehabilitation program increased muscle strength (Saleh, 2018) examined the effects of a rehabilitation program using an aquatic environment on improving some motor abilities in children with spastic cerebral palsy.

The researchers aim to address the rehabilitation of children with simple spastic cerebral palsy, emphasizing the importance of early intervention for faster and better

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rehabilitation. The study also aims to develop exercises and use an aquatic environment for the rehabilitation of children aged 6-8 years with simple spastic cerebral palsy, assessing the impact of aquatic exercises on the rehabilitation and motor abilities of this age group.

The researchers identified statistically significant differences between pre-test and post-test results for the research sample, indicating the effectiveness of the aquatic exercises in the rehabilitation process.

The research field included physically disabled children with simple spastic cerebral palsy, males aged 6-8 years, at the Happiness Institute for Physically Disabled Individuals in Baghdad. The temporal scope ranged from July 25, 2023, to October 1, 2023, and the spatial scope was the rehabilitation therapy hall at the Happiness Institute. The researchers employed an experimental method with a single-group pretest-posttest design, suitable for addressing the research problem. This approach was chosen based on the nature of the problem and its requirements (Ibrahim, 2000).

MATERIALS AND METHODS

Procedures

The research sample, consisting of five individuals with simple spastic cerebral palsy, was purposively selected from the Happiness Institute for Physically Disabled Individuals in Baghdad. The researchers ensured homogeneity in variables such as height, weight, age, and severity of the condition to establish a common starting point for the intervention.

This article's necessary ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 17.01.2024 Issue/Decision No: 2024/13. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki , and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

Table 1. Shows the homogeneity of the sample in variables (height, weight, age, and severity of the condition).

Variable	Unit of Measurement	X	SD	Median	Skewness
Height	cm	130.4	29.53	130	0.081
Weight	kg	24.33	7.21	24	0.166
Age	years	7.75	1.18	8	0.421
Severity of Injury	All individuals in the sample of children with simple spastic cerebral palsy				

Mean (X), Standard Deviation (SD)

Regarding the methods, tools, and equipment used in the research, they included Arabic and foreign sources, the internet, personal interviews, a medical scale, a Sony camera, Kinovea software for extracting joint motion media, a measuring tape, a swimming pool, and warm water.

The tests used in the research are as follows

Flexibility

Measured using Kinovea software for the range of motion of the shoulder joint and rising from a seated position on a chair.

Measurement

Calculated the time it takes to rise from the chair upon command.

Balance

Conducted balance tests tailored to the sample of those with injuries, including walking a distance of 5 meters and measuring the number of steps by walking on a straight line on the ground, 10 cm wide, over a distance of 5 meters.

Strength

Measured strength through grip strength, calculated in kilograms. The researchers conducted a pilot experiment on July 25, 2023, in the physical therapy hall to understand the workflow, the assisting team, the test procedures, and the rehabilitation program's progress.

The preliminary tests were conducted on July 27, 2023, at 10 AM in the rehabilitation hall at the Institute of Happiness in Baghdad. The main experiment was implemented on the research sample, applying aquatic rehabilitation exercises with progressive repetitions from easy to difficult, focusing on stability exercises in the initial units, followed by more challenging exercises involving changes in walking directions inside the water to improve balance. The post-tests were conducted on

October 1, 2023, at 10 AM in the Institute of Happiness for Physical Disabilities in Baghdad under the same conditions as the preliminary tests.

Statistical Analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Table 2. shows the results of two tests (pre and post) for the range of motion test.

N.	Variables	Measurement Unit	Pre-Test		Post-Test		t Value	Error Level	Significance
			M	SD	M	SD			
1	Shoulder Range of Motion	Degrees	115.8	35	128.3	37.88	3.119	0.001	Significant
2	Rising from Seated Position on Chair	Seconds	5.2	1.81	4.22	1.55	4.310	0.026	Significant

Table 3. shows the results of two tests Pre-Test and Post-Test of strength and balance variables for the research sample.

N.	Variables	Measurement Unit	Pre-Test		Post-Test		t Value	Error Level	Significance
			M	SD	M	SD			
1	Strength	kg	3.22	0.18	5.83	1.77	3.088	0.001	Significant
2	Balance	Number of Steps	15.21	3.76	10.48	3.53	3.381	0.013	Significant

DISCUSSION

As evident from Tables (2) and (3), which display the means, standard deviations, differences in means, differences in standard deviations, calculated t-values, and error levels for the pre-test and post-test of the experimental group in the shoulder range of motion, sit-to-stand, muscle strength, and balance tests for the research sample, significant differences are observed.

The researchers attribute these significant differences to the exercises designed and implemented within the aquatic environment, aiming to enhance the range of motion and balance. The exercises, involving balanced steps after several rehabilitation units applied to the sample, led to increased joint and muscle flexibility. The role of rehabilitation exercises goes beyond providing the range of motion for muscles, tendons, and ligaments. The diversity in exercise types stimulates nerve activity around the shoulder joint, a point emphasized by (Singer,1982; Sadek, 2000) who highlights that aquatic exercises enhance functional device stimulation by raising the efficiency of neural and muscular work, aiding in muscle metabolic processes.

Moreover, walking with aquatic supports and performing ascending and descending movements in the water using existing aids, along with exercises involving rubber balls, contributed to improving grip strength (Samiha, 2010; Mufti, 1998). also emphasized the positive effects of aquatic exercises on muscle strength development. The physical properties of water greatly facilitated better performance of rehabilitation exercises. The researchers confirm that aquatic exercises harmonized with aquatic therapy, significantly contributing to strength development.

The aquatic rehabilitation exercises also contributed to muscle growth, and the researchers noted that each movement encountered specific core muscles. Regular rehabilitation exercises increased the activity of muscles around the joints by intensifying the difficulty of rehabilitation exercises. Every increase in difficulty, as mentioned by (Nasif, 1998), corresponds to an increase in the capacity of organic devices, ensuring their growth and development.

Conclusions

Based on the results obtained, the researchers concluded: The rehabilitation program within the aquatic environment effectively

improves motor skills for individuals with spastic cerebral palsy in the research sample, the effectiveness of the aquatic rehabilitation program contributed to enhancing strength and balance through diversified exercises in the aquatic environment for the research sample.

Recommendations

According to the conclusions, the researchers recommend: Raising awareness and promoting the culture of rehabilitation exercises among various community segments, emphasizing the necessity of engaging in rehabilitation exercises and avoiding surgical interventions as quick solutions, and using small brochures with diverse exercises for different injuries and distributing them within physical therapy centers .

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Conflict of Interest

The author declare no conflict of interest.

Ethics Committee

This study was performed by adhering to the Helsinki Declaration. ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 17.01.2024 Issue/Decision No: 2024/17

Author Contributions

Planned by the authors: Study Design, SBH and SAH ; Data Collection, SBH and SAH; Statistical Analysis, SBH and SAH ; Data Interpretation, SBH and SAH ;Manuscript Preparation, SBH and SAH; Literature Search. All authors have read and agreed to the published version of the manuscript

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Appendix: Aquatic Rehabilitation Exercises

1- Seated Chair Exercises:

In a seated position on a chair, the therapist moves each finger individually, then brings the fingers together in a bending, stretching, and rotating motion.

2- Seated Chair Foot Exercises:

While seated on a chair, the therapist moves the right injured foot in bending, stretching, and rotating motions, repeating the process on the other foot.

3- Underwater Seated Chair Exercises:

Seated on a chair in the water, the therapist moves the right leg of the patient from the knee joint upwards and then lowers it downwards, repeating the process on the other leg.

4- Pool Standing Exercises:

In a pool, the patient walks two steps forward and then returns two steps backward, followed by five steps forward with the assistance of the therapist.

5- Seated Chair with Small Ball in the Pool:

Seated on a chair in the pool with a small ball beneath the injured patient's feet, the patient rolls the ball forward.

6- Pool Walking with Handle Support:

Walking inside the pool, the patient takes five steps forward while holding onto the pool's edge.

7- Assisted Pool Walking:

Walking inside the pool, the patient takes two steps forward, then returns two steps backward, followed by five steps forward with the assistance of the therapist.

8- Seated Chair Assistance in the Pool:

Seated on a chair in the pool, the patient, with the therapist's assistance, stands up and then sits back down on the chair.

9- Seated Chair Assistance with Wheeling:

Seated on a chair in the pool, the patient, with the therapist's assistance, pushes the chair handle while standing up.

10- Side Walking in the Pool:

Inside the pool, the patient walks two steps to the left, then returns to the starting position with the therapist's assistance.

11- Side Walking in the Pool (Other Side):

Inside the pool, the patient walks two steps to the right, then returns to the starting position with the therapist's assistance.

12- Seated Chair with Small Ball on Thighs:

Seated on a chair in the pool with a small ball on the injured patient's thighs, the patient lifts and lowers the ball to a comfortable level with the assistance of the therapist.

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RESEARCH ARTICLE

The Modeling Role in Learning Desirable Sports Behavior (Mohamed Salah Model)

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Abstract

This study investigates in learning the desired sports behavior by observing and imitating one of the sports models, the Egyptian football player Mohamed Salah, on a sample of (322) football players at Beni-Suef University. The data were collected through several methodological tools represented in: Questionnaire form, direct observation, and analysis of documents and records. The results of the research were analyzed in the light of the basic processes that the social learning process goes through, which are attention, retention, production, and motivation. The results of the study revealed that young people realize the existence of a model that performs the desired sports behavior. The majority of young people know the sporting history of this model, its popularity and the social status it enjoys, and they want to observe and imitate this model, so they pay attention to all components of sports behavior through several means such as watching matches in stadiums, the media, and the personal account of the model on Social networking sites, and the majority of young people try to keep the components of the mathematical behavior of the model in memory, and then they try to visualize the production of this behavior mentally in a symbolic way, before they try to The product of some aspects of the model's mathematical behavior in reality in a selective manner due to their inability to implement all components of this behavior despite the desire and motivation to learn all components of the model's mathematical behavior.

Keywords
Learning, Modeling Role, Desirable Sporting Behavior, Mo Salah

INTRODUCTION

Text The word model refers to the root of your expectations, which can be followed (Bahn, 2001). It is by observing others that our thoughts develop as to how a particular behavior should be (Bandura, 2010). The two researchers believe that the concept of the model can be defined in the current study - a procedural specification - as it refers to the example athlete who desires young athletes to learn the main components of their desirable creative sports behavior through observation and imitation. Role-Model is defined as "one of the well- known others whose pattern and behavior an individual follows in the exercise of a particular social role. Social learning theory or modeling learning has emphasized the importance of social interaction, social norms, and the social context or conditions in which the learning process occurs, which means that learning does not take place in a vacuum but rather takes place in a social setting (Cookely, 2008). Ethical standards must be observed during matches, and we cannot say that a person's behavior is moral unless we know the person's motives behind this behavior. Desirable sporting behavior includes intense striving to win matches, with a commitment to teamwork and ethical standards during and after play. (Abod & AlHaddad, 2022).

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The researchers believe that it is possible to define the concept of the desired sports behavior in this study - procedurally - to mean the sports behavior to be learned, which can be inferred through several indicators, it is the behavior that includes skill and intense struggle to win matches.

Respect for members of the other competing team, adherence to the laws and regulations that organize matches, humility, adherence to moral principles, avoiding aggressive behavior while playing, cooperating with the playing team, (Al-Razqi, 2015). working in team spirit, accepting winning or losing matches in a sporting spirit, and benefiting from the

experience that He acquires it in different matches in evaluating performance and trying to improve this performance while playing in the upcoming matches.

In light of the foregoing, there is a need to change aggressive behavior and sports fanaticism, and work on acquiring a spirit of tolerance, humility, adherence to moral principles, and lofty social values that guide young people towards the desired behavior (Rusul & Ishraq, 2022). The researchers believe that the unwanted behavior of young people can be changed by encouraging young people to learn the desired pattern of sports behavior through modeling and by observing one of the famous sports models that perform the desired pattern of behavior, and working to simulate and imitate the behavior of this model, which represents a role model.

Many scholars believe that Bandura's theory of observational social learning has provided an explanatory framework of theoretical and applied value for human behavior in the social and environmental context in which it occurs, which has been neglected by other learning theories. Social learning, where Albert Bandura has been criticized for focusing on visible behaviors, despite his praise and belief in the importance of hidden factors. Bandura has also been criticized for his anti-psychoanalysis, which made him ignore obvious human problems such as conflict and unconscious drives (Górska-Kłęk & Mełeszko, 2011).

Based on the foregoing, the research problem emerges, which can be formulated in a main question: “To what extent are young people able to learn the desired sports behavior” through modeling, that is, by observing and imitating a well-known sportmodel that performs the desired sports behavior?

Purpose From the analysis of the previous available studies, it is clear that there are many studies that dealt with the relationship of sport with some variables such as social values, academic achievement, ambitions, social mobility, and violence. We note that there is a conflict or conflict between the results of some of these studies. It is also clear that most of these studies are empirical studies and are not often guided by any theoretical framework.

It is also clear from the review of previous studies that there is a dearth of studies that clarify the relationship between sport and social systems, especially the education system .

MATERIALS AND METHODS

Participants

This research is a descriptive analytical research, and this research was relied on the social survey method by using the comprehensive inventory method, where the field study was conducted on all 322 football players at Beni Suef University, including 118 players in theoretical colleges (PEUK, n = 36, 64% of the total sample). Including 204 players in practical colleges (PEUK, n = 63, 35% of the total sample). These football players were identified by referring to the documents and records in the Youth Welfare Department of the various theoretical and practical faculties of Beni Suef University.

This study was performed by adhering to the Helsinki Declaration. Ethical approval of the study was obtained from University of Baghdad, Iraq Ethics Committee at the board meeting dated 16.01.2024 and numbered No:6. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

Measure

A- Questionnaire form

To collect the quantitative data required by the study, the questionnaire consists in total of 37 questions distributed over six main axes, the first axis: preliminary data (1-8), the second axis: data on the extent to which young people perceive the

existence of a model that performs the desired sports behavior (9- 14), the third axis: data on the attention of young people and the extent of their observations of the model's sports behavior (15-19), the fourth axis: data on the extent to which young people retain in memory their observations about the basic components of the model's sports behavior (20-24), the fifth axis: data on the ability of Young people on the production and implem entation of the components of the sports behavior of the model (25-31), the sixth axis: data on the otivation of young people towards learning the sports behavior of the model (32-37). We find that all the questionnaire questions are of the standardized type and closed- ended questions, which facilitates the process of data unloading and the process of statistical analysis, with the exception of only two questions of the open-ended type so that all possibilities and unexpected responses can be obtained.

Validity was ascertained by presenting the questionnaire to a group of arbitrators. Reliability was also confirmed by re-testing twice for a deliberate sample of 20 student athletes. The internal stability of the questionnaire questions was confirmed by using a parameter The reliability was Cronbach's Alpha, and the reliability coefficient was 87%, which confirms the presence of a high degree of internal stability for the questions of the questionnaire.

B-Interviewing Guide

It includes six themes that include general questions with open endings that encourage the respondents to digress in answering and provide their information freely about the various processes involved in the respondents' learning process of sports behavior.

C-Direct observation

By observing the football players during matches inside the university, and observing the extent to which these athletes imitate the model, such as they imitate the model in dress and wear T-shirts bearing the model's name, picture and shirt number in the matches.

D-Social networks

In the process of collecting the necessary data, the researchers used the news of the model (Mohamed Salah) to be published on social networking sites, especially Facebook, Twitter, and YouTube, given that it is one of the sites most used by young people, and which provides its services to Internet users.

Table 1. Sample characteristic

	Faculties	N	%
	Physical Education	54	16.77%
	Agriculture	39	12.11%
Practical Faculties	Science	35	10.87%
	Physiotherapy	29	9.0%
	Nursing	25	7.76%
	Medicine	22	6.83%
	Total	204	63.35%
	Commerce	33	10.24%
Theoretical Faculties	Arts	30	9.316%
	Education	28	8.695%
	Law	27	8.385%
	Total	118	36.65%

Procedure

The spatial (geographical) boundaries of this research are limited to the various faculties of the University of Beni Suef, which are located within the framework of the city of Beni Suef.

The human limits of the research include male students who play football within the various theoretical and practical faculties of Beni Suef University. As for the time limits of this research, the time required for the data collection process took a month and a half, starting from the first of March 2019 until mid-April of the same year.

Statistical analysis

After completing the data collection process through the questionnaire form, the data processing process began, where the researchers entered the data by using the STATISTICA 13.1 software , and some statistical operations were performed such as preparing simple and compound tables, calculating frequencies, percentages, and testing the significance of differences between variables using a test (Ka^2), which helped the researchers to quantitatively analyze the data. The researchers also relied on a qualitative analysis of the data obtained through direct observation.

RESULTS

According to Albert Bandura's social learning theory, learning about social behavior in general first requires a model that performs the desired behaviour. There are also four basic processes associated with the learning process, which are: attention, retention, production, and motivation.

In light of the above, the researchers believe that the research results can be divided into five main sections as follows:

Athletes' awareness of the existence of a model that leads to the desired sporting behavior

By asking the athletes about football players in theoretical and practical colleges about their opinion of the existence of a model in football that performs the desired sports behavior, all the athletes answered that this model currently exists, and it is represented in the Egyptian football player (Mohamed Salah).

It was found from interviews with the athletes in the focus group that they see the Egyptian player Mohamed Salah as one of the most popular football players in Egyptian society, as confirmed by social networking sites on the Internet. Therefore, the athletes confirm that Mohamed Salah is a sport model to follow, not only from their point of view, but from the point of view of all groups of Egyptian society at the present time.

Table 2. Descriptive statistics of the total sample of undergraduate students according to their knowledge of the sport history of the model "Mo salah" (N = 322).

Variables	Theoretical Faculties	Practical Faculties
They know the sport history of the model "Mo Salah"	71	142
They not know the sport history of the model "Mo Salah"	47	62
the total	118	204

It is clear from the data received that 60.2% of the total number of players in theoretical colleges know the sport history of the model, while 39.8% do not know this history. It is also clear that 69.6% of the total number of players in practical colleges know the sport history of the model, while it turns out that 30.4% do not know the sport history of the model. Also, the majority of university youth in both theoretical and practical colleges know the sport history of the model. There are no statistically significant differences between the students' responses in both theoretical and practical faculties with regard to their knowledge of the sport history of the model, as the value of the coefficient (Ka^2) was not significant.

The results of the research revealed that the majority of athletes in both theoretical and practical colleges were usually comparing the sport behavior of the model (Mohamed Salah) with other sports models of football players, as shown in the following table.

Table 3. Distribution of athletes according to their comparison between the sport behavior of the model and other models. (N = 322)

Variables	Theoretical Faculties	Practical Faculties
They compare	82	157
They don't compare	36	47
the total	118	204

It is clear that 69.5% of the total athletic players in theoretical faculties were comparing the sport behavior of the model with other models, while 30.5% did not make this comparison, and 77% of the total players in practical faculties were doing this comparison, while the percentage of 23% do not make this comparison. The majority of athletes in theoretical colleges and most athletes in practical colleges usually compare the sport behavior of the model with other models of football players. It was also found that there were no statistically significant differences between the responses of the athletes in both theoretical and practical colleges with regard to their comparison between the sport behavior of the model and the behavior of other models, where the value of the coefficient (Ka2) was not significant.

It became clear from the interviews conducted by the two researchers using the interview guide and through the focus group discussion, that the athletes do not usually compare the components of the sport behavior of the model (Mohamed Salah) and other sport models in the Egyptian society, but rather they compare this model with other models with The international fame of football stars such as the world famous star and Portuguese national (Cristiano Ronaldo), the star of the Spanish team Real Madrid, the Argentine player (Lionel Messi), the star of the Spanish team Barcelona, and the Brazilian player Neymar da Silva, the star of the Paris Saint-Germain club. The data in the following table illustrate the most important factors that made the athlete (Mohamed Salah) a role model.

Table 4. Distribution of athletes according to their opinion of the most important factors that make the athlete a model. (N = 322).

Variables	TheoreticalFaculties	Practical Faculties
social status	25	33
Skill in playing	21	47
Adhere to ethical principles	18	28
Respect the referees	15	18
Belonging to the homeland	13	23
attractive model	11	22
Model collaboration	9	18
The model is in the athletes age category	6	15
the total	118	204

It is clear that 21.2% of the total number of athletes in theoretical colleges believe that the social status enjoyed by the model is one of the most important factors that made the athlete a role model, followed in terms of importance, respectively: skill in playing performance (17.8%), and adherence to In terms of moral principles (15.3%), the model's respect for the referees and the rules of play (12.7%), belonging to the homeland and community participation (11%), the attractiveness of the model (9.3%), the model's cooperation with the playing team (7.6%), and that the model is in the same age group as the youth (5.1%). As for athletes in practical colleges, 23% agreed that skill in playing is one of the most important factors that made the player a role model. This is followed by the social status of the model (16.2%), adherence to moral principles (13.7%), belonging to the homeland and community participation (11.3%), attractiveness of the model (10.8%), respect for the model for referees and rules of play (8.8%) and cooperation of the model with the playing team (8.8%), and finally that the model is in the same age group as the athletes (7.4%). This confirms that the social status enjoyed by the model, the skill in playing the game, humility and adherence to moral principles are among the most important factors that made the athlete (Mohamed Salah) a role model. It was found through interviews with focus groups that young athletes see that the athlete (Mohamed Salah) represents a role model for several factors, the most important of which is his skill in playing the game that made him compete with other world-renowned sports models such as (Ronald), (Messi).). In addition, this model has personal and social features that attract young people, including respect for the rules of play, a

sense of belonging and loyalty to the homeland, and a spirit of tolerance, humility and commitment to social values. There are also no statistically significant differences between the responses of the athletes in both theoretical and practical colleges with regard to their opinion of the most important factors that made the athlete (Mohamed Salah) a role model, as the value of the coefficient (Ka2) was not significant.

Table 5. Distribution of the athletes according to their attempt to imitate the sport behavior of the model. (N = 322)

Variables	TheoreticalFaculties	Practical Faculties
Imitates the sportbehavior of a model	42	82
Its does not Imitates the sport behavior	76	122
the total	118	204

The majority of players in both theoretical and practical faculties did not attempt to actually perform the production or implementation of the sport behavior of the model in a practical way. It was found that there were no statistically significant differences between the respondents in both theoretical and practical faculties with regard to their attempt to produce and implement the sport behavior of the model in a practical way, where the value of (Ki^2) was not significant.

Table 6. Distribution of athletes according to their most important motives to learn the components of the sport behavior of the model. (N = 322)

Variables	TheoreticalFaculties	Practical Faculties
Rewards that the model receives	57	99
The social status of the model	44	66
attractive model	17	39
the total	118	204

It is clear that one of the most important motives of young people towards learning the components of the sport behavior of the model is to obtain the reinforcements and rewards resulting from this behavior, followed by the importance of obtaining the social status and fame that the model enjoys, and finally the attractiveness of the model for young people and their tendency to imitate its sports behavior.

DISCUSSION

The basic perspectives in sociology differed in their interpretation of sports. Owners of a career perspective believe that sport is beneficial to society and performs several social functions that lead to the preservation of the social structure. This was supported by some of the results of the previous available studies that confirmed that there is a relationship between sports and social values that guide the behavior of young people in society. Sports also raise the aspirations of young people, provide job opportunities for them, and provide opportunities for rising social mobility, which is one of the motivations for young people to learn sports behavior (Zaid & Neamah, 2021).

On the other hand, we find that those with a conflict perspective see that sport is non-functional, leads to multiple negative results, and fails to strengthen the social structure (Abod & AlHaddad, 2022). This was confirmed by the results of some previous available studies, the results of which indicated that sports may lead to a lower level of educational attainment for young people. It also leads to intolerance and reinforces violent behavior between players and spectators of matches in sports stadiums, especially football stadiums, and such negative aspects may lead to parents not motivating young people to play football and regular training, fearing that this will lead to a lower level of their academic achievement. and their aggressive behaviour (Ismail & Al-Zuhairi, 2022).

In the face of these negative aspects that may be associated with sports, there is a need for young people to learn the desired sports behavior by observing and imitating one of the famous sports models such as the Arab star Mohamed Salah (Meriam & Sahira,2021). The results of this study revealed that young athletes in theoretical and practical faculties know the sporting history of this model, and see that their behavior is a model of the desired sporting behavior, not only from their point of view, but from the point of view of all groups of Egyptian society at the present time (Abraham, et al, 2018). The young athletes among the respondents confirm that one of the most important factors that made the athlete Mohamed Salah a role model is his skill in playing the game, the social status and fame he enjoys, his extreme humility and adherence to moral principles, his respect for the rulers and the rules of play, his cooperation with the playing team, in addition to his feeling by belonging to the community.

Conclusions

It seems that the sports model plays an important role in shaping the desired behavior of its followers from the players, through their viewing of the model while playing in different sports matches, or indirectly by following the news of the model in the media, especially television, and through the model's personal account on websites Social communication, especially Facebook, and through statements made by the model's friends, relatives, and those around him in the country of origin. It was also found that the majority of young people always pay attention to the components of the sporting behavior of the model, especially with regard to playing skill, and are interested in observing the physical and verbal responses that this model performs during play, and they are interested in observing how this model is trained and the extent of its cooperation and respect for the playing team, its respect for arbitration and adherence to the rules of play In addition to his respect for the opposing team and not making aggressive physical or verbal responses towards members of the opposing team during sports matches. It was found that the most important factors that affect the attention of young people to the components of the sport behavior of the model are the desire to learn the sport behavior of the model, the tendency to the characteristics and qualities of the model, the convergence between the age of youth and the age of the model, in addition to the maturity level of young people.

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Conflict of Interest

We declare that this article we wrote is not involved in any conflict of interest.

Ethics Committee

This study was performed by adhering to the Helsinki Declaration. Ethical approval of the study was obtained from University of Baghdad, Iraq Ethics Committee at the board meeting dated 16.01.2024 and numbered No:6.

Authors Contribution

Study Design, TIL and MIM; Data Collection, TIL and MIM; Statistical Analysis, TIL and MIM; Data Interpretation TIL and MIM Manuscript Preparation, TIL and MIM; Literature Search, TIL and MIM. All authors have read and agreed to the published version of the manuscript.

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RESEARCH ARTICLE

The Effect of Smit-Style Training on the CPK Enzyme, Kinetic Response Speed, and Accuracy of the Blocking Skill for Young Volleyball Players

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Abstract
The purpose of this paper is to prepare volleyball-style (SMlT) exercises, as well as identify the effect of (SMlT)-style exercises on the CPK enzyme, speed of kinetic response, and accuracy of the blocking skill for young volleyball players. The researchers to use the experimental method because it is compatible with the nature of the research problem, and to design the method of the two equal groups (experimental and control) with pre- and post-tests. The research population was determined by the young players of Al-Daghara Sports Club for the sports season (2023-2024), who numbered (14) players, and the freestyle players, who numbered two players, were excluded because their characteristics did not match the nature of the study. Thus, the total number became (12) players, and the researcher chose them entirely for the experiment, and they were distributed. Two groups were divided equally in a random manner (lottery method), after which the experimental group underwent training (SMlT) method, while the control group remained using the trainer's normal training curriculum. One of the most important results reached by the researcher is that: The exercises applied by the experimental research group using the SMlT method helped adapt the muscle cells by increasing the activity of the CPK enzyme . One of the most important recommendations recommended by the researchers is that: Researchers recommend adopting specialized exercises using the SMIT method as basic data when training volleyball players.

Keywords
Smit-Style Training , CPK Enzyme, Kinetic Response Speed, Volleyball

INTRODUCTION

The field of training has been affected in recent years by the revolution of science and technology, as the training process took a form, structure and organization consistent with the state of new development of methods, methods and means used in the training process (Radhi & Obaid, 2020b; Radhi & Obaid, 2020a) Scientific and technical development has added many new and modern methods in a way that is compatible with the nature and capabilities of the trainee through striving Coaches have to choose the best and most up-to-date methods that suit the specialized activity. Training methods have varied to raise the level of athletic achievement, and it has become extremely important for the coach to be familiar with and knowledgeable about these methods. Accordingly, scientific research has tended toward studying various sciences, including chemistry, biomechanics, anatomy, and sports physiology (Al-Waleili, 2000), And employing it to serve the science of sports training in order to raise the level of athletes in all sports, because these sciences are of fundamental importance in developing and evaluating training methods, and knowing the responses and adaptations that occur during the practice of sports activity, with the aim of achieving and investing in the specificity of training related to the type of activity in order to reach A direct impact on improving the skill, physical, functional and tactical level.

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One of the games that has received great attention in the field of sports training is the game of volleyball, because of its specificity in performing its skills, as it requires great muscular ability in addition to functional ability and high bio-kinetic capabilities when performing kinetic duty, in addition to enduring the offensive and defensive performance of volleyball, which requires High level of physical and skill performance.

The skill of blocking the is one of the skills that requires the player to have a high level of physical and skill performance in a consistent manner, so it is important that the physical capabilities and the physiological and skill variables serve each other to achieve the goal, and the level of the player's ability can be determined through these variables (Aleh, Radi, & Hashem, 2020).

One of the modern training methods is the SMlT method, which is one of the latest training methods that uses high-intensity training and moderate rest, with increased speed and strength for physical performance, and this is appropriate to the nature and characteristics of the game to create a state of functional adaptation, improve energy systems, and raise the physical level of the players.

All of this is worthy of study and research (Saikaew, 2015; Kazem, Alim, & Rady, 2022) especially if we know that there are those who do not pay attention to the effectiveness of this training method. Thus, the importance of research is evident through preparing SMIT-style training in a scientific manner, as researchers believe that it affects the enzyme (CPK) and the speed of the kinetic response, which is directly involved. On the accuracy of the blocking skill for young volleyball players.

Through the researchers' field experience and their follow-up of the Iraqi youth league matches, they noticed that there is a slowdown in the stages of technical performance of the blocking skill, which is reflected in the success and accuracy of that skill and directing the balls to the opponent's court. The researchers believe that the reason for this is the lack of coaches' use of exercises that are not compatible with the prevailing energy system. For the game of volleyball, the time to perform the skill does not exceed several seconds, and this falls within the phosphate energy system, as the majority of the exercises used go towards performance endurance and enter into the other energy system, so the researchers wanted to delve into this experiment by using (SMlT) style exercises, as Researchers believe that it will contribute effectively to developing the physiological, physical and skill aspect of the player, especially if we know the lack of use of the training method (SMIT), which is considered one of the training methods that develops the body's ability to its highest levels, as it helps to develop strength, speed and other bio-kinetic capabilities, and it also It is the first study in Iraq and the Arab world that uses the (SMlT) method. Through the above, the research problem is evident in the following question

Does using SMlT-style training have a positive effect on the CPK enzyme, kinetic response speed, and accuracy of the blocking skill for young volleyball players? . the research objective: eas prepare volleyball-style (SMlT) exercises, as well as identify the effect of (SMlT)-style exercises on the CPK enzyme, speed of kinetic response, and accuracy of the blocking skill for young volleyball players.

MATERIALS AND METHODS

Research Methodology

The method is one of the important factors that the researcher follows to solve his problem, and it is chosen according to the nature of the problem to be studied, as the nature of the problem necessitates (Saleh, Radi, & Hashem, 2020) the researchers to use the experimental method because it is compatible with the nature of the research problem, and to design the method of the two equal groups (experimental and control) with pre- and post-tests.

Community and sample research:

The research population was determined by the young players of Al-Daghara Sports Club for the sports season (2023-2024), who numbered (14) players, and the freestyle players, who numbered two players, were excluded because their characteristics did not match the nature of the study. Thus, the total number became (12) players, and the researcher chose them entirely for the experiment, and they were distributed. Two groups were divided equally in a random manner (lottery method), after which the experimental group underwent training (SMlT) method, while the control group remained using the trainer's normal training curriculum.

This study followed ethical standards and received approval from the University of Baghdad College of Physical Education and Sports Sciences

for Woman Ethics Committee Commission Date: 12.02.2024 Issue/Decision No: 2024/12. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

This article's necessary ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 12.02.2024 Issue/Decision No: 2024/12. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki , and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

Sample homogeneity

In order to control the variables that affect the accuracy of the research results, the researchers resorted to verifying the homogeneity of the research sample related to morphological measurements, namely (height, body mass, chronological age, training age), as the researcher used the skewness factor before proceeding to apply th main experiment to the two research groups (Control and experimental) as shown in "Table 1".

Table 1. shows the homogeneity of the research sample.

Variables	Measuring unit	Mean	Median	Std. Deviations	Skewness	Results
Length	Cm	184.75	184.5	1.879	0.399	homogeneity
Mass	Kg	75.812	75.63	2.286	0.238	homogeneity
Chronological age	Year	18.5	18.6	0.516	0.581	homogeneity
Training age	Year	4	4.1	0.564	0.531	homogeneity

From the results of Table (1), it is clear that the values of the skewness coefficient are smaller than (±1), which indicates the homogeneity of the research community in all variables.

Devices, tools and methods used in the research

Methods of data collection

Arab and foreign sources and references, personal interviews, tests and measurements, special forms to record test results for players.

Tools and devices used

Volleyball court, (14) volleyballs (Mikasa type), Colored adhesive tape (4), Measuring tape (40 metres), Terraces and barriers of different heights (70, 60, 50, 40, 30) cm (10), Medical cotton, sterile materials, A Chinese-made electronic device to measure height and weight, Bell balls (ball blocks) of different weights (2 kg, 4 kg, 6 kg), number (20), Casio sports stopwatch (3), (2) whistles, type (FOX), Office tools (paper and pens), (1) Lenovo laptop calculator, A Chinese-made electronic device to measure height and weight.

Field Research Procedures

Description Of CPK Enzyme Measurements

Measurement Method

Measurement of the concentration level of the CPK enzyme in the blood was performed immediately after giving the effort (volleyball block test). After completing the effort, the tester sits on a chair immediately after (5) seconds have passed, then venous blood is drawn (2 C). C) by the chemist from the research community, numbering (12) players, which is a sufficient quantity according to what was indicated in the instructions attached to the kits, as it is placed in medical tubes (tubes) with the player's name and number written on them, and it was transported directly to the laboratory, where The analysis of the enzyme kits is performed by a specialist doctor.

***Modified Nelson Kinetic Response Test* (Shaker, Tuama, & Radhi, 2022):**

Purpose of the test: to measure the ability to respond and move speed and accurately according to the choice of stimulus.

Necessary tools

A flat area free of obstacles, with a length of (20 m) and a width of (2 m), within which three lines are drawn. The distance between one line and the other is (6.40 m), and the length of the line in the middle is (1 m). A volleyball is placed hanging and falling on the ground on the two side lines. It is

preferable that it be Testing on the volleyball court. Electronic stopwatch, Measuring tape,

Administer the test

A.Recorder

Calls the names first and records the time of taking the test second.

B.Timer

Giving the start signal with the timing.

Performance specifications: The tester stands at one end of the center line, facing the timer, who stands at the end of the other end of the line. The tester takes a ready position so that the center line is between the feet, then leans his body forward slightly. The timer holds the stopwatch in one hand and raises it to the top, then speed moves his arm to the left or the right, and at the same time he starts the clock. When the experimenter responds to the start signal, he tries to run as speed as possible in the specified direction to reach the side line, which is 6.40 m away from the center line. He performs a diving skill to touch the hanging ball, and when the experimenter crosses the right side line, the timer stops the hour .

Test instructions

- If the tester starts in the wrong direction, the timer continues to run the clock until the tester changes direction and reaches the correct side line and touches the ball.
- The experimenter is given (8) consecutive attempts, with (20) seconds of rest between each attempt and the next, with (4) attempts in each side, and the attempts in each side are chosen in a random and successive manner.
- The laboratory is given a number of attempts outside the measurement under the same basic conditions for the purpose of familiarizing itself with the test procedures.
- The timer must practice the start signal so that he can give this signal with the arm and start the clock at the same time.
- The laboratory must not know the number of attempts required of it to perform in order to limit its expectations.
- The diving skill must be performed correctly, and the attempt must be repeated if the tester fails to perform the diving skill correctly.
- The test must begin with the timer displaying a signal (Ready - Start) on all attempts as shows “Fig. 1”.

Recording method

The time for each attempt is calculated to the nearest 1/100 second.

Laboratory score is the average of the eight attempts, as shown in the equation below:

-

$$total\ score\ of\ the\ laboratory = \frac{total\ time\ of\ the\ eight\ attempts}{8}$$

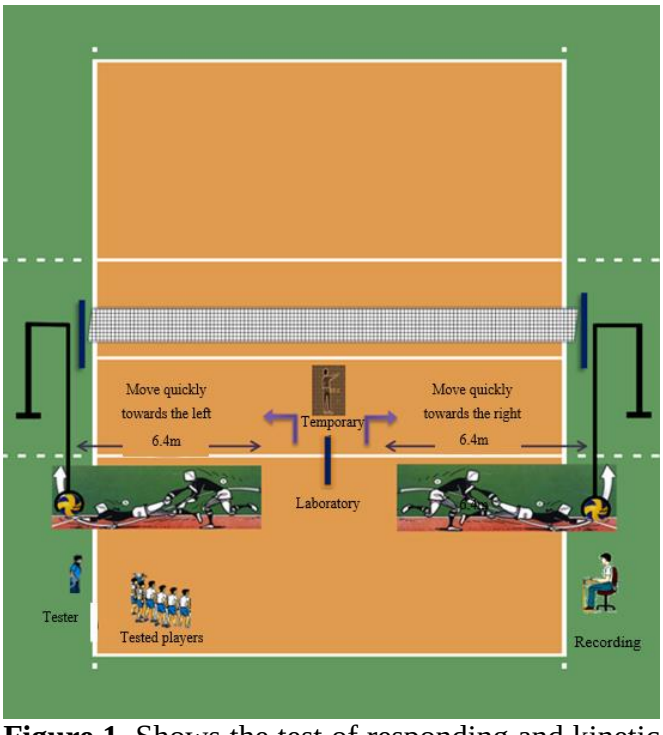

Figure 1. Shows the test of responding and kinetic speed and accuracy according to the choice of stimulus.

Testing the accuracy of the blocking skill (Hashem, Al Edhary, Radhi, & Hmeid, 2022).

- Test name: Accuracy of the Blocking skill.
- The aim of the test: to measure the accuracy of the skill of blocking the with volleyball.
- Tools used: a legal volleyball court, 5 legal volleyballs, and colored adhesive tape to divide the opposite court.
- Performance specifications: The tester stands in position (3) in front of the net, at a distance of (50) cm from the net, and in a position of preparation for the blocking process. The coach performs the smash hit skill from the opposite court, and the tester performs the blocking skill when he hears the sound, as shown. In Figure (2).

Performance conditions

Each laboratory has (5) consecutive attempts. The smash must be good in each attempt. Grades are calculated according to where the ball landed, as follows:

- In the center 2 degrees.
- In 3rd place, three grades.
- In 4th place, 2 degrees.
- Outside these areas (zero) grades.

Recording

The tester will be credited with the grades obtained in the five attempts, noting that the maximum grade for the test is (15) degree.

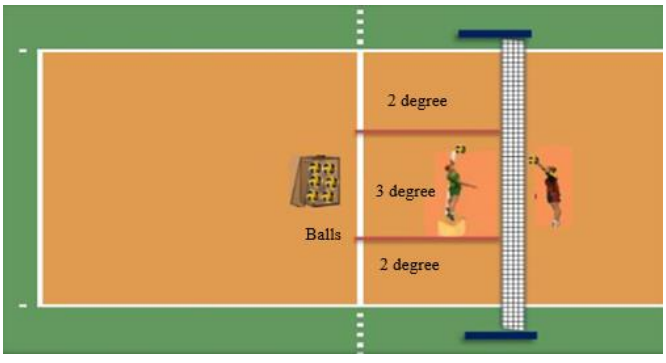

Figure 2. Shows the accuracy test of the volleyball blocking skill

Exploratory experience

The researchers conducted a reconnaissance experiment on a sample of the original research community and the same research sample, with a number of (4) players on 17/10/2023. The exploratory experiment aims to:

Ensure the validity and suitability of the playground, the tools and devices used, and the research supplies. Organizing the auxiliary work team, and the required instructions. Knowing the readiness of the research sample to perform skill tests. Know the time the tests take.

Main experience

Pre-tests

After completing and verifying the exploratory experiment, the researchers implemented the main experiment by applying tests and standards to the research community, and pre-tests were conducted on Thursday 19/10/2023.

Equivalence of the two research groups

In order for the researchers to be able to attribute the differences that occur in the results of the post-tests for the variables under study to the effect of the experimental factor, the researchers resorted to verifying the equality of the two groups by using the t-test for independent samples of the variables investigated.

Table 2. Shows the equality of the two research groups

Variables	Measuring unit	Control group		Experimental group		T calculated	Level sig	Type sig
		X	SD	X	SD			
CPK enzyme activity after stress	IU / L	318.8	30.141	301.6	32.175	0.429	0.679	Non sig
Speed of kinetic response	Second	1.976	0.084	1.989	0.069	0.383	0.71	Non sig
Accuracy of the Blocking skill	Degree	6.687	1.824	6.976	1.589	0.947	0.454	Non sig

*p ≤0.05 below, 10 degrees of freedom , Arithmetic Mean (X), Standard Deviation (SD)

Through Table (2), it becomes clear to us that the value of the test significance level (sig) is greater than the significance level (0.05), and for all variables under study, therefore, the test significance is not significant.

Preparing and implementing exercises using the SMIT method

The researchers prepared and organized the exercises using the SMIT method, based on the researchers' personal experience, and they were applied to the experimental group on 21/10/2023 until 20/12/2023, taking into account (intensity, repetitions, and appropriate rest periods). The researchers codified these exercises on a scientific basis. As well as the physical and functional ability of the research sample, the tools used, and the training method, so that these exercises are able to develop the level of CPK enzyme activity, the speed of kinetic response, and the accuracy of the blocking skill to achieve the purposes and objectives of the training process.

The details of the SMIT-style training in the training curriculum are as follows

The total number of training units that included SMIT-style training was (24) units, and the number of weekly training units that were implemented was (3) units for a period of (8) weeks. The time of training using the SMIT method in one training unit is (25-30) minutes. The goal of SMIT-style training is to develop the activity level of the CPK enzyme, the speed of kinetic response, and the accuracy of the blocking skill. Taking into account the exchange of work between muscle groups. Planning training formations using the SMIT method during the weekly and daily units (1-2).

Post-tests

The researchers, with the help of the assistant staff, conducted the post-tests for the research sample after completing the SMIT-style exercises, and that was on (23/12/2023) and in the same sequence as the pre-tests, as the researcher took into account the same conditions in which the pre-tests were conducted in terms of the sequence of tests.

Statistical Analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Presentation and discussion of the results of the pre- and post-tests for the control and experimental groups for the variables under investigation: Presentation of the results of the pre- and post-tests for the control group for the investigated variables.

Table 3. Shows the resulte for pre- and post-tests for the control group for the investigated variables.

Variables	Measuring unit	Pre-test		Post-test		T calculated	Level sig	Type sig
		X	SD	X	SD			
CPK enzyme activity after stress	IU / L	301.6	32.175	341.2	30.812	3.48	0.025	Sig
Speed of kinetic response	Second	1.976	0.084	1.873	0.045	3.938	0.011	Sig
Accuracy of the Blocking skill	Degree	6.687	1.824	9.325	0.524	4.958	0.000	Sig

*p ≤0.05 below, Arithmetic Mean (X), Standard Deviation (SD)

Presentation the results of the pre- and post-tests for the experimental group for the investigated variables

Table 4. Shows the shows the resulte for the pre- and post-tests for the control group for the investigated variables.

Variables	Measuring unit	Pre-test		Post-test		T calculated	Level sig	Type sig
		X	SD	X	SD			
CPK enzyme activity after stress	IU / L	318.8	30.141	415.6	31.251	12.942	0.00	Sig
Speed of kinetic response	Second	1.989	0.069	1.813	0.030	6.601	0.001	Sig
Accuracy of the Blocking skill	Degree	6.976	1.589	11.967	0.749	5.867	0.000	Sig

*p ≤0.05 below, Arithmetic Mean (X), Standard Deviation (SD)

Presentation the results of the tests (post-post) for the control and experimental groups for the investigated variables.

Table 5. Shows shows the resulte differences between the test (post-test) for the control and experimental groups for the variables investigated.

Variables	Measuring unit	Control group		Experimental group		T calculated	Level sig	Type sig
		X	SD	X	SD			
CPK enzyme activity after stress	IU / L	341.2	30.812	415.6	31.251	2.903	0.016	Sig
Speed of kinetic response	Second	1.873	0.045	1.813	0.030	2.378	0.039	Sig
Accuracy of the Blocking skill	Degree	9.325	0.524	11.967	0.749	7.460	0.000	Sig

*p ≤0.05 below, Arithmetic Mean (X), Standard Deviation (SD)

DISCUSSION

The results presented in Tables (3) and (4) for the tests of the variables showed that there were significant differences between the pre- and post-tests and in favor of the post-tests for the control and experimental groups. The researchers attribute the reason for this significant difference to the members of the control group due to the exercises that were applied using methods and techniques prepared by the trainer. In its training units, the repetitions performed by members of the control group and the continuation of sports training lead to the occurrence of functional adaptations in certain proportions, and among these adaptations is the concentration of the enzyme (CPK) (Sameer, Rashid, & Radhi, 2022), as well as the development of kinetic response speed and its reflection on the accuracy of the skill of blocking the in volleyball, and this is what The members of the control group helped to make this difference. As for the difference that occurred for the members of the experimental group in the level of activity of the enzyme (CPK), the researchers attribute it to the members of the experimental group's use of exercises prepared by the researchers using the (SMIT) method, which were codified according to energy production systems appropriate for muscle work, as the The training units prepared by the researchers helped improve the players' physiological ability, according to what was noted. The researchers also made sure that the SMIT-style exercises worked in accordance with the specific requirements of the game, the players' physical and physiological capabilities, and the goals of the research. This resulted from their use of extreme anaerobic exercises that are characterized by intensity. (Allawi and Abdel Fattah, 1984). This leads to a state of adaptation necessary for energy production, and the reason is also due to the high-intensity physical loads that were practiced repeatedly because training increases the effectiveness of the CPK enzyme, as the work falls within the phosphate energy system, as training according to this system increases The concentration rate of the enzyme (CPK) is high, and this is what the results showed. The nature of performance in the game of volleyball depends mainly on high phosphate energy to carry out kinetic tasks that require strong and rapid muscle contractions. This game has a specificity that distinguishes it from other games, as it constitutes the phosphate energy system. (80%) of the energy needed to play volleyball (Al-Waleili, 2000). This is what the researchers were keen on when they repeated the training using the (SMIT) method.

The researchers also attribute the reason for this difference between the pre- and post-measurements of kinetic response speed to the keenness of the experimental group members and their commitment to performing exercises according to the (SMIT) method on a continuous and regular basis, and this also helped in the occurrence of a concomitant development of performing high-intensity physical effort, and this is what Saikaew Chuachan pointed out. He pointed out that "organized training according to the SMIT method leads to functional and physical changes. Well-trained individuals can adapt to the functional changes that occur in the body's systems as a result of muscular effort and continue with this effort" (Saikaew, 2015; Kazem, Alim, & Rady, 2022.).

The researchers also made sure that these exercises were in multiple and varied directions of movement because this would contribute to the player's ability to perform skills better, especially the speed of kinetic response, which is closely linked to the skill of blocking the . Thus, the

exercises prepared in the (SMIT) style have worked to improve speed. The movement transition represented by the speed of response through organizing the muscular action between contraction and relaxation of the working muscles, which helps in performing the movement easily and in an organized manner. This is consistent with what pointed out, "SMIT-style exercises include multi-directional movements, which... "It makes it one of the best exercises used to improve physical abilities" (Radhi & Obaid, 2020b; Radhi & Obaid, 2020a). Because speed, diversification, and change in play from one skill to another, whether it is a defensive or offensive skill, requires the player to have a high degree of speed and reaction speed, as believes, "The game of volleyball is one of the games that has variable and fast situations." (Radhi & Obaid, 2020b), so the researchers paid attention to response speed training and linked it to the accuracy factor of the skill of blocking in volleyball, in order to make the response integrated with its speed and accuracy. Thus, the exercises prepared using the (SMIT) method contributed effectively to developing the speed of kinetic response and accuracy of the skill of blocking in volleyball, etc. This is reinforced by what stated, "Performing tactical skills or duties is done First, intellectually, and secondly, kinetic. This leads to carrying out the duty speed and in the shortest possible time." (Hussein, 1990). Thus, SMIT-style physical exercises accompanied by skill exercises showed significant results in differences because they work to integrate physical and kinetic abilities together in performance.

As for the results presented in Table (5), which show the preference of the differences in favor of the experimental group in the post-tests, the researchers believe that the exercises that were given to the members of the experimental group that were applied using the (SMIT) method created adaptations to the body's functional systems due to their exposure to extreme physical loads, which were It falls within the phosphate energy system, as it requires a rapid release of energy, and the time for performing exercises reaches the range of (10-14) seconds, and the enzyme (CPK) is considered one of the important and direct factors in accelerating the release of energy in the body by rebuilding ATP) as the phosphate system depends In rebuilding ATP on the chemical compound creative phosphate, the enzyme (CPK) transfers the phosphate group from the compound creatine phosphate to adenosine diphosphate (ADP) to form adenosine triphosphate (ATP) and creative, and vice versa, and the player needs energy. To continue physical performance, as "the energy that is liberated during the fission of adenosine triphosphate (ATP) is considered the direct source of energy that the muscle uses to perform the required work, but the amount of ATP stored in the muscle is very small and is not sufficient to produce energy for more than a few seconds. If there is ATP in the muscle cell, there will be no muscle movement or contraction, so ATP is constantly being rebuilt through ATP rebuilding systems (Sameer, Rashid, & Radhi, 2022) and (Allawi and Abdel Fattah, 1984).

The researcher also attributes the reason for the development of the members of the experimental group at the expense of the members of the control group in the speed of kinetic response is due to the nature of the exercises that were applied in the (SMIT) method, which helped to develop this ability because it was of an explosive nature and changed from one moment to the next, as the speed of the response depends on movements with a response. Momentary action, which was applied by the members of that group, contributed greatly to the process of linking the speed of response and the skill of blocking, which is one of the requirements for the success of performing these skills with extreme speed and accuracy. Likewise, the principle of diversification and change that the researchers used, in addition to continuous and scientific repetitions, contributed greatly to the development of This ability depends on fast and sudden movements, and this is what Magill confirmed when he said, "Diversifying and organizing training experiences and diversity in movement will increase the players' experience and increase the player's ability to perform the skill better" (Khalaf , 2001) and (Al-Jburi, Rashid, & Radhi, 2022).

The exercises were also prepared to be consistent with the nature of performance and the movement paths of the blocking skill, and they were codified according to the (SMIT) method, which is one of the training methods that raises the body's ability to its maximum limits, to be a challenge to the anaerobic energy systems, as it uses muscle strength and speed to contribute to the development of the physiological aspect. The physical aspect of the player is that the skill of blocking the requires great muscular ability and

rapid performance without decreasing the level of performance and facing fatigue. Here it should be noted that the majority of the skill exercises prepared by the researchers fall within the anaerobic energy system, and this is in line with the literature of the (SMIT) method, and this is confirmed by studying the objectives of the SMIT method .“His training aims to improve specific energy systems, primarily, and its goal is to provide adaptation and efficiency in the phosphorous energy system.” (Paquette et al., 2017)

Conclusions

Based on the research results that were reached within the limits of the research community, it was possible to reach the following conclusions: The exercises applied by the experimental research group using the SMlT method helped adapt the muscle cells by increasing the activity of the CPK enzyme. The continuous training of exercises that were applied using the SMlT method led to the creation of adaptations that express the extent of the development of the experimental research group in the speed of kinetic response and accuracy of the skill of blocking the with volleyball. The development of the concentration of the enzyme (CPK) and the speed of the kinetic response led to the development of the accuracy of the skill of blocking the in volleyball for young players.

Recommendations

Researchers recommend adopting specialized exercises using the SMIT method as basic data when training volleyball players. Conduct a periodic evaluation of training results through physiological variables and kinetic response speed as important indicators for evaluating the training status of players. Conduct similar studies on other individual and group activities, and on different age groups.

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Conflict of Interest

We confirm that all tables and figures in this article are ours and written by the researchers themselves.

Ethics Committee

This study was performed by adhering to the Helsinki Declaration. ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 12.02.2024 Issue/Decision No: 2024/12

Author Contributions

Research Design- Z. A. , M. N; Statistical analysis- Z. A. , M. N, A.H; Preparation of the article, Z. A. , M. N , AK, A.H; Data Collection- Performed by Z. A. , M. N , AK, A.H.

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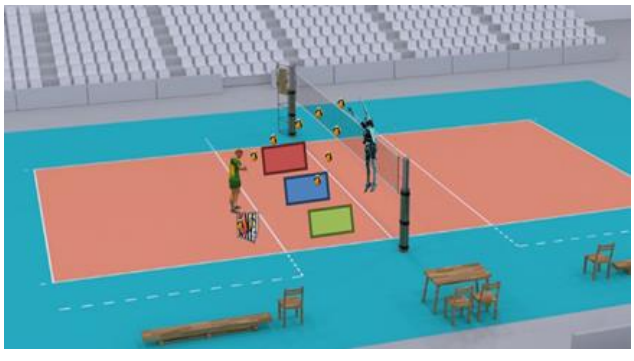
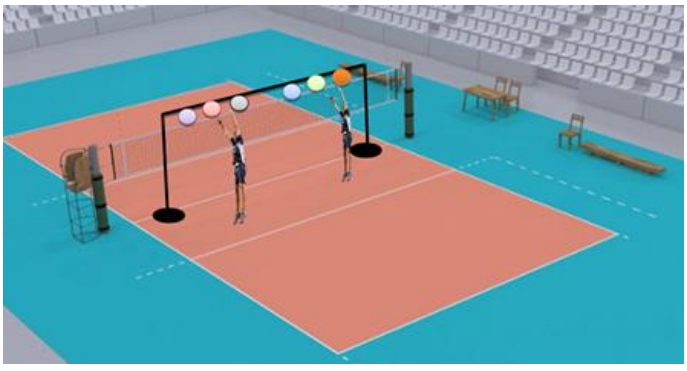
Appendix (1)

A sample of exercises prepared and applied using the SMIT method.

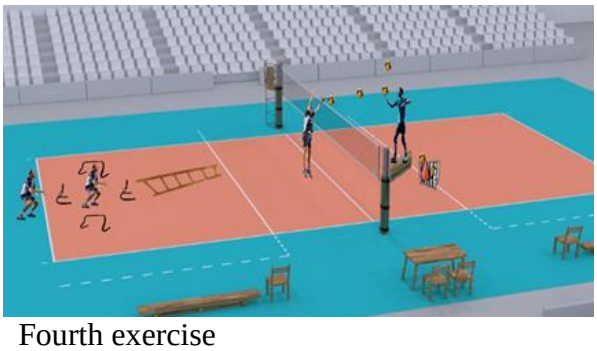
- First exercise:
- Objective of the exercise: Developing (blocking skill, response speed)
- Equipment and tools used: (10) legal volleyballs, (3) spongy floor mats, (1) electronic stopwatch, (1) whistle.
- Perform the exercise: The player stands at position (3) near the net, and the coach stands on the other side of the field above the attack line at position (3). The sponge floor mat is placed in the attacking area and the distance between them is (1 m) and a distance of (45 cm) is left from the side line. The coach throws the ball to the player, then determines the color of the square in which he wants to drop the ball, so the player can create a blocking and try to put the ball inside the desired square.



- Second exercise:
- Objective of the exercise: to develop (the skill of blocking the and speed of response).
- Equipment and tools used: hanging colored balloons, (1) electronic stopwatch, (1) whistle.
- Perform the exercise: The player stands at center (3) near the net and fixes the two poles on the other side of the field with (6) colored balloons hanging in it. At the signal to start the exercise, the player creates a repelling and tries to touch the hanging balloons, according to the color that the coach releases.

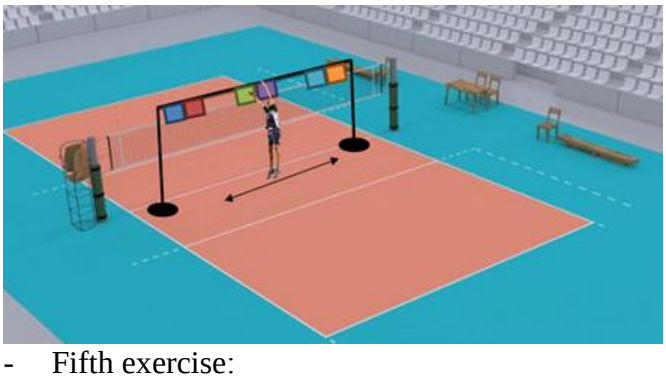


- Third exercise:
- Objective of the exercise: Developing (the skill of blocking the and speed of response)
- Equipment and tools used: legal volleyballs (10), ground ladder (5 m), barriers (40 cm) high (4), benches (60 cm) high, electronic stopwatch (1), whistle (1). 1.(
- perform the exercise: Four hurdles (40 cm) high are placed in the middle of the court at the beginning of the service line. The player stands in the middle of the hurdles, and the coach stands on the bench on the opposite side in position (3). When the exercise begins, the player jumps with both legs. Over the right hurdle and then back to the middle, then he jumps with both legs to the left hurdle and returns to the middle, then jumps backward with both legs and returns to the middle again. After that, the player jumps forward with both legs and jumps over the ground ladder by jumping once open to the outside of the ladder and another time together. Inside the ladder, the student then goes towards the net to block the balls directed by the coach.

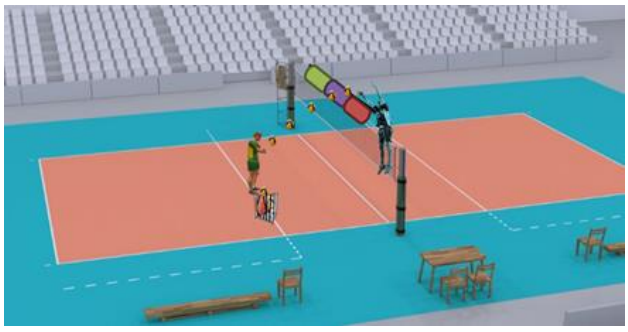


- Fourth exercise
- Objective of the exercise: to develop (the skill of blocking the , speed of response).

- Equipment and tools used: hanging colored pieces, (1) electronic stopwatch, (1) whistle.
- perform the exercise: The player stands at center (3). On the opposite side of the field are placed hanging colored pieces. At the signal to start the exercise, the player creates a blocking and tries to touch the hanging pieces according to the color that the coach calls.



- Fifth exercise:
- Objective of the exercise: to develop (blocking skill, response speed).
- Equipment and tools used: (12) legal volleyballs, (3) colored boards measuring (75 x 30 cm), (1) electronic stopwatch, (1) whistle.
- perform the exercise: Three colored boards are placed on the net, each board a different color. The coach stands above the attack line, and the player stands in front of the boards at a distance (55 cm) from the net in position (3). The coach calls out the color of the board and throws the ball in order to The player creates a blocking in front of him.



- Sixth exercise:
- Objective of the exercise: to develop (blocking skills, response speed).
- Equipment and tools used: (10) legal volleyballs, a flexible rubber band, (1) balance ball with a diameter of (90 cm), (1) bench with a height of (60 cm), (1) electronic stopwatch, (1) whistle.(1) .
- perform the exercise: The player stands on a balance ball at center (3) near the net and is secured with a flexible rubber band from the student's waist, held by the coach. M. stands. The coach is on the opposite side of the field, above the bench at center (3), and when the exercise begins, M. The coach throws the ball up to perform a smash hit, and the player creates a blocking by jumping and landing on the balance ball.

Appendix (2)

Shows the sample of training units

Training unit/first, Training unit intensity: 90%, Exercise time: (28.43) minutes

No.	No. Exercise	Time to perform the exercise	Rest between one exercise and another	Total working circuit time (SMIT) method	Total rest time between exercises for a SMIT style circuit	Rest time between circuits
1	2	15.5sec	90sec	102.9sec	450sec	300sec
2	3	16.6sec	90sec			
3	1	18.8sec	90sec			
4	4	16.6sec	90sec			
5	5	16.6sec	90sec			
6	6	18.8sec	-----			
Then repeat the same circuit once during the training unit						

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RESEARCH ARTICLE

The Impact of A Computerized Educational Program in Learning the Skill of the Accuracy of the Rectal Transmitter in Land Tennis for 10 Years Ages

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Abstract
The purpose of this paper is to lies in determining the impact of the computerized educational instructions in learning the skill of accurate straight serve in ground tennis for students aged 10 years. The use of a computerized educational program is one of the important things used to improve the level of performance in learning skills faster among students. The use of advanced equipment also contributes to making the educational process interesting and attracting learners to exercises in a pleasant and exciting way. The use of this computerized educational method also has an effective impact on scientific research because the world is now considered developed and fast, and keeping pace with development puts us at the global level. If you do not keep pace with development, learners will not obtain high-quality results. In addition, a heartbeat, it will put them at the bottom of the rankings, especially since the target age group in the research is students. Their use of advanced educational devices and programs will have a positive impact during their academic subjects. The sample of the current study was a group of students from Al-Jawahiri Primary School. The researchers have employed the experimental method via specifying the experimental and control groups with after and before tests. The research sample was divided into (7) students for each group, and the computerized educational program was conducted on the research sample. The researchers concluded that the outcomes of the experimental group have been better than the results of the "control group".

Keywords
Computerized Educational Program, Kinetic Learning, Straight Serve, Ground Tennis

INTRODUCTION

Actually the skill of tennis is the cornerstone , key to offensive play and striking power in the modern game of tennis. The skill of accurate straight serve is considered one of the important skills in the game of tennis. It is widely used due to its importance in playing the game. If students do not learn this skill, they will lose winning points in sports matches and competitions. The use of a computerized educational program is one of the important things used to improve the level of performance in learning skills faster among students. The use of advanced equipment also contributes to making the educational process interesting and attracting learners to exercises in a pleasant and exciting way (Moneim, 2020). The use of this computerized educational method also has an effective impact on scientific research because the world is now considered developed and fast, and keeping pace with development puts us at the global level (Al-Dulaimi and Al-Shammari , 2018) . If you do not keep pace with development, learners will not obtain high-quality results, and therefore; it will put them at the bottom of the rankings, especially since the target age group in the research are students, and their use of advanced educational devices and programs

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will have a positive impact on them during the academic subjects. The significance of the paper is to know the effect of the computerized educational program in learning the skill of accurate straight serve in ground tennis for students aged 10 years (Hussein, 2022). The impact of designing an e-learning program. The Ruffini model, with various educational methods in the most important mental processes and learning some tennis skills for female students , have been employed. Dissertation PhD. Mustansiriya University. College of Basic Education, Department of Physical Education. The paper's goals lies in designing an electronic educational program by employing the Ruffini model, with diverse educational methods in the most important mental processes and learning some tennis skills for female students. And specify the impact of employing the accompanying electronic educational design program with diverse educational methods about the most important mental processes for female tennis students. The researcher has employed the experimental method by designing (two equal groups with pre-test and post-test) in a way that suits the problem's nature and fulfills the paper's aim. The researcher has employed the experimental method by designing (two equal groups with pre-test and post-test) in a way that suits the nature of the problem and achieves the goal of the research.

Through field visits to schools and observing students, as the researchers are teachers, it was noted that there is a problem in learning the skill of straight serve for students in tennis, so the researchers decided to shed light and attention to find a solution to this problem.

The researchers have employed the experimental method with design of the experimental and control groups with before and after tests for suiting the nature of the problem to be solved.

MATERIALS AND METHODS

The researchers have employed the experimental method with design of the experimental and control groups with before and after tests for suiting the nature of the problem to be solved.

Participant

The research community was identified as a group of students in the fifth stage of primary school, numbering (90 students) aged 10 years. The research sample was chosen as (18 students) by determining the sample percentage in a random manner, and after (4 students) were excluded for the exploratory experiment, the number of the sample became (14 students), split into two parts (7 students, an experimental group, and 7 other students, a control group). Then the researchers determined the sample percentage of the population (15.55).

This study followed ethical standards and received approval from the University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 25.12.2023 Issue / Decision No: 2023/11. Participant provided informed consent, with the volunteer form covering research details, risks, benefits, confidentiality, and participant rights. The research strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing participant's rights and well-being in design, procedures, and confidentiality measures.

Description of tests

Accuracy test for straight serve skill

In evaluating the level of accuracy of the straight serve in tennis, the researchers relied on the White test, which measures the accuracy of the serve in tennis, according to the researchers' experience.

Aim of the test: to know the serve accuracy "Description of the performance": The tested student stands behind the server base, then serves ten consecutive balls at the targets specified in the opposite half of the court, provided that all the balls pass between the net and the rope, so that the player tries to obtain the highest score.

Register

1- Balls that touch the net or rope are not counted as a try and must be repeated again.

2- Balls that pass over the rope are counted as an attempt and a score of zero is awarded, even if they fall into any of the goals.

3- Every correct ball has a score value in the area where the player's score falls, which is the sum of the points he obtains from the ten attempts.

The highest score for the test is 60.

Exploratory experiment

The researchers conducted a reconnaissance experiment on October 5, 2023, corresponding to Thursday, on a sample of the original research population, which numbered (4) students. The aim of conducting the exploratory experiment was to

identify the sample members' understanding of vocabulary and tests, and to know the propriety of the test for the research sample members as well as obstacles facing the researcher when implementing his main experiment, and to clarify the research goal for the sample.

Scientific foundations of tests

Validity of tests: It scales with sufficient accuracy the phenomenon it was placed to scale , but it never scales anything instead of it. Besides , the researcher used content validity to extract validity of the tests by presenting them to a group of experts and specialists who agreed on the validity of the tests.

Reliability of tests

The Test Reliability means the test gives same results if the test is repeated on negative individuals in the same circumstances. The test-retest method has been employed to find the reliability coefficient and time difference of one week, as the tests were applied to the exploratory experiment sample. Then it was repeated with a time difference of one week on 10/12/2023, corresponding to (Thursday), as that indicated below

Table 1. Shows test parameters

Tests	Stability coefficient (R)	Validity factor $\sqrt{R}$	Error level
Accuracy of straight test	0.948	0.973	0.001

At a degree of freedom (9) and a significance level of (05.0)

The method of giving the proposed exercises to the students and corrective information after each repetition by help of a team under the supervision of the researchers.

Field procedures

Pre- tests

After completing the exploratory experiment, the given team, under the researchers' supervision , conducted pre-tests on Friday, October 14, 2023, on the selected sample.

Main experience

The assistant team implemented the proposed exercises under the supervision of the researchers to members of the research sample on (Sunday), corresponding to (16/7/2023). The educational program (from the main section of the educational unit) was conducted with two educational units every week for five weeks . The time the educational unit took has been sixty minutes according to the sports activity of the selected sample. The proposed exercises were applied to the research sample at a rate of two educational units per week. The research sample was a group of students from Al-Jawahiri Primary School, fifth stage, aged 11 years. The research was conducted at the University of Baghdad stadium, and the research period was from 9/5/2023 to 9/7/2023, and the work was done as follows:

Computerized educational programme

Preparation of the computerized programme

After conducting pre-tests on the sample, the researcher used video models (skill exercises) in the game of tennis and inserted the video models into the electronic devices (Device No. 1) to make the videos the optimal performance for the selected sample. Electronic devices were placed near the players in the main experiment, and the players begin by looking at (optimal performance) and then apply what they see. Then the player will come to watch his performance himself on (Device No. 3) and compare his performance with the optimal performance. In order for the assisting team to correct the player's mistakes, the player's performance was filmed in real time using (Device No. 2) from the player's side axis. It was connected to (electronic computer No. 3) and through the Internet and a special program to record and display the performance in real time. (Lets View) Thus, the footage on device (device No. 2) is broadcast (to device No. 3) and the player's performance is displayed (on electronic computer device No. 3) for the player so that he can see his performance for himself and compare his performance with the typical performance, and the student's mistakes are corrected under supervision Trainer. See Figure (1)

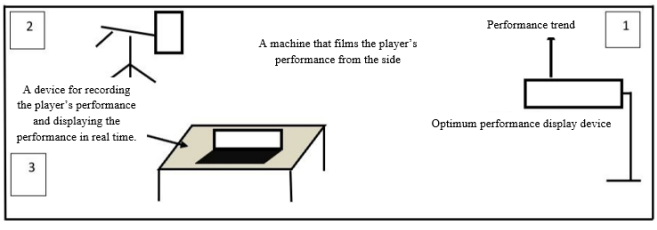

Figure 1. Shows the mechanism of action in the main experiment.

1- Performance trend.

Optimum performance display device.

2- A machine that films the player's performance from the side.

3- A device for recording the player's performance and displaying the performance in real time.

The exercises were completed on November 19, 2023, Sunday.

Post-tests

The posttests were conducted on the research sample on Sunday, November 20, 2023, under the same conditions as the pretests.

Exercises used

Model presentation/computer skill presentation

- the ball must pass until it reaches the throat at centers (1 and 5).
- Players serve and try to pass the ball from within the four sequential rings (1, 2, 3, and 4).

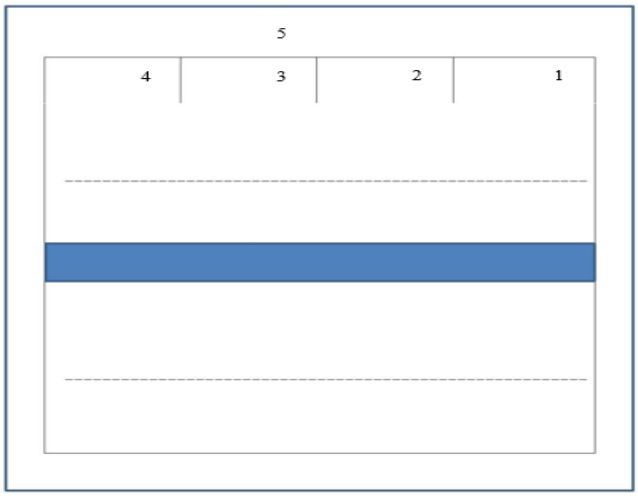

Figure 2. Shows the performance of exercises in the specified areas.

- The players stand in the form of two opposite trailers behind the attack line facing the net and begin serving to a teammate.
- The same previous exercise is repeated with the rings placed at a height, and the player is asked to serve from within these rings to the teammate.
- The players serve to the ring placed in the center (1 and 5).
- Players perform the same exercise above, placing ropes at different heights over which

Statistical methods

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Presentation, analysis of the results" for the control group to test the accuracy of the straight serve skill. Shows the outcomes of (arithmetic means), (th standard deviations), calculated (t) value, the difference of the means, the deviations, the importance , the percentage of error, and the degree of freedom for the control group sample.

Table 2. The accuracy test for the straight serve skill.

Statistical features	Pre-test		Post-test		Mistake Percentage	Connotation
	S	A	S	A		
Control group	4.11	0.83	5.33	1.83	0.03	
Difference rates	1.22	Deviation difference 0.55		Calculated (t) value -2.34		Moral

By degree of freedom (7) and a probability of error (0.05).

From Table (2), it is clear that the "arithmetic mean" of the before the has been (4.11) with a "standard deviation" of (0.83). "The arithmetic mean" of the post-test has been (5.33) with a "standard deviation" of (1.83). As for the calculated (t) value (-2.34), the dissimilarity of means has been (1.22), the dissimilarity of standard deviations has been (0.55), and the error percentage at (0.03) in degree of freedom (7) and a significance level at (0.05) which shows that there are essential dissimilarities between after the test and before the test.

Presentation and analysis of the results of the research sample for the pre- and post-test of the experimental group sample to test the accuracy of the straight serve skill.

Table 3. Shows the results of the research sample for the pre- and post-test of the experimental group sample to test the accuracy of the straight serve skill.

Statistical features	Pre-test		Post-test		Mistake Percentage	Connotation
	S	A	S	A		
Experimental group	5.27	0.88	5.33	1.88	0.01	
Difference rates	1.12	Deviation difference 0		Calculated (t) value -1.87		Moral

* in a degree of freedom (7) and a probability of error (0.05).

From Table (3), it is clear that the arithmetic mean of the pre-test was (5.27) with a standard deviation of (0.88). "The arithmetic mean" of the post-test was (5.33) with a "standard deviation" of (0.88), while the calculated (t) value was (-1.87), the difference of means was (1.12) and the difference of standard deviations was (1). The error rate was (0.01) at a degree of freedom (7) and a significance level (0.05), which shows that there are essential dissimilarities between after the test and before the test.

DISCUSSION

The outcomes were presented in Table (2) and (3) for the experimental and control groups before and after the test , and the outcomes of the experimental group have been better than the results of the control group. The researchers attribute that the educational program had a positive impact on learning the accuracy of the serve in tennis, and that the use of advanced technology contributed to attracting the attention of the learners. It also contributed to making the educational environment exciting and exciting for learning, and the method used was liked by the students since the students were young. They expected that researchers would like the method because it contains animated images and videos. Therefore, the educational program had good effects on the students, and this study agrees with the study (Sha'lan & Almaaitah, 2023), that showed the surpassing of the experimental group over the control group in learning the accuracy of the straight serve in ground tennis for students. It was found that there have been statistically essential dissimilarities at ($a \leq 0.05$) in learning the accuracy of transmission between the experimental group and the control group for the post-tests. The researchers attributed the surpassing of the experimental group over the control group in respect to the video exercises in the educational program used for the experimental group. This study is appropriate with the study of (Ameen & Fadhil, 2023; Muhammad, 2021) , where the most significant goals of the paper has been the preparation of an educational program by empoying the EISENKRAFT example in the accuracy of serving and shooting in volleyball for students. The similarities of the study were the category of students and the preparation of an educational program, and the effect of the educational program was positive on the results of the study. This study is consistent with the study of (Hussein & Radi, 2023; Shukr, 2016) , as it adopted the investigation of the teaching and learning processes by presenting the educational material in an organized manner, basing its work on modern sources for displaying snapshots, video films, audio, and written texts. The researchers concluded by confirming the educational program having a positive impact on the experimental group. The researchers concluded the results of the experimental group were better than the control group, and this proves the credibility of the program used.

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Conflict of Interest:

There is no personal or financial conflict of interest within the scope of the study.

Ethics Committee

Board Name: College of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq. Social Sciences Ethics Committee Commission Date: 25.12.2023 Issue / Decision No: 2023/11.

Author Contributions

Study Design: MSR, AJS, TSK; Data Collection: MSR, AJS, Statistical Analysis: MSR; Data Interpretation: MSR, AJS, TSK; Manuscript Preparation: MSR, AJS, TSK; Literature Search: MSR, AJS, TSK. All authors have read and agreed to the published version of the manuscript.

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RESEARCH ARTICLE

The Impact of Rehabilitation Exercises and Infrared Device on Knee Osteoarthritis Rehabilitation in Women Over 40 Years

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Abstract
The study aimed to prepare exercises using infrared radiation and identify its effect on the rehabilitation of women with osteoarthritis at the age of (40) women. The researchers assumed that there were statistically significant differences between the results of the rehabilitation tests for women with osteoarthritis (muscular strength, degree of pain, range of motion) pre and post. For the research group, the experimental method was adopted by designing the experimental group on a sample that was intentionally chosen by (100%) of the women suffering from this injury who are attended by the Al-Warith Center for Physiotherapy / affiliated with the Abbasid Shrine, who number (6) injured. The researchers prepared the rehabilitation exercises according to systematic steps that took a period of time to prepare and implement for the period extending from (5/1/2023) until (5/19/2023), with an application rate of (3) consecutive qualifying weeks, each week of which (3) units represented Rehabilitation sessions, bringing the total number of sessions to (9) rehabilitation units. The conclusions are that applying rehabilitative exercises using infrared rays helps rehabilitate women suffering from knee osteoarthritis by developing the strength of the muscles surrounding the joint and thus getting rid of the injury. It was determined that there were significant differences at the $p<0.05$ level of Muscular strength, Motor range and Degree of pain. The researchers recommend the need for centers to pay attention to Physiotherapy and should develop the expertise of the therapists working in it on how to apply rehabilitative exercises using infrared radiation in light of the findings of this study.

Keywords
Rehabilitation Exercises, Infrared Rays, Knee Roughness

INTRODUCTION

Researchers have researched a lot of research and studies and reviewed many books and scientific references that focused on knee osteoarthritis (Faleh, 2017; Khurabit, 2022), which gained the attention of researchers and specialists because it is the most common due to the many causative factors, some of which are acquired because the individual is aware of their results, and others come about due to lack of adherence to health standards and neglect of precautionary aspects that avoid the owner from being exposed to excruciating pain (Mahmoud, 2020). It hinders human movement, which prompted us to search for the reasons and causes that lie behind the occurrence of knee pain, on the one hand. And knowing the natural methods and methods that can be employed and used in treating it, including (all types of movement therapy, physical therapy, and therapy using infrared radiation), the researchers have found at the core of their research factors that are almost neglected, but they have an effective effect and influence in causing pain and fueling its severe, excruciating attacks.

A feature of our research is the diagnosis of atypical causes. According to this description of the cause, we have drawn up a treatment methodology derived from the nature of the condition, where we have adopted methods that have a natural therapeutic property, which we will

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go on to explain in the course of our research, and which are preceded by diagnostic methods (Ghazali et al. 2021).

Through the exploratory experiment with its scientific dimensions and comparison with the results and pre-tests, the researchers will deal with a number of precise scientific postulates and draw the specific framework for the therapeutic exercises that are characterized by innovation on the one hand and ease of acceptance on the other hand by the injured person, which enables him to practice them with desire and ease because they intervene by changing the course of his structural condition, and there is a factor It is calculated for the sustainability of therapeutic exercises because they are inexpensive without the need to use unavailable methods and tools and achieve good results. The idea of carrying out the research came as an effort and the result of the spirit of the multidisciplinary team, which pours into the crucible of diagnosis and treatment of knee osteoarthritis.

Also, this study is only an attempt on how to rehabilitate knee osteoarthritis injuries and return to the normal position. Here lies a problem, and therefore the research problem focused on the lack of research that uses infrared rehabilitation exercises, and through informing the researchers of some experiences in the rest of the countries that dealt with infrared training. This is a new experiment that the researcher hopes will be successful. The research aimed to prepare rehabilitation exercises accompanied by infrared radiation to rehabilitate those suffering from osteoarthritis of the knee at the age of (40) women, and to identify the effect of exercises accompanied by infrared radiation in rehabilitating women with osteoarthritis (muscle strength (flexion and extension)) at the age of (40) women. The researchers assumed that there are differences Statistically significant between the results of rehabilitation tests for women with knee osteoarthritis (front and back thigh muscle strength) pre and post for the research group.

The areas of research were: a sample of women suffering from knee osteoarthritis, numbering (6) for the period from 2/25/2023 until 1/2023. And in the physical therapy hall in the Al-Warith Center of the Abbasid Shrine

MATERIALS AND METHODS

In the field of scientific research, choosing the correct approach to solve the problem depends mainly on the nature of the problem itself in order to reach the truth and reveal it. Therefore, the researcher adopted the experimental method with one group with two pre- and post-tests in order to suit the objectives of the research. A good sample selection will reduce sampling errors, which enhances the validity of the sample. The data and its accuracy represent the research community. The research community consists of people visiting the Al-Warith Center of the Abbasid Shrine in Karbala Governorate. The process of selecting the research sample is one of the problems that researchers face in their research, as the results of that research depend on it. Researchers must choose the research sample that. It represents the community of origin honestly with the aim of obtaining accurate results, and the researcher is the one who chooses the sample that suits his research and is the one who estimates his need for information that achieves his purpose.

In light of this concept, the research sample was chosen intentionally, as they were infected women in Karbala Governorate, aged (40 and above), who were diagnosed by doctors specialized in (Al-Warith Physiotherapy Center affiliated with the Abbasid Shrine), numbering (6) women.

Study Ethics

This study was conducted with the approval of the Ethics Committee of Al-Warith Center for Physiotherapy with reference number (ACP-2024-0338). All participants provided voluntary informed consent before participating in the study. The study protocol was conducted in compliance with the principles outlined in the Declaration of Helsinki and other relevant ethical guidelines. We ensured the privacy and confidentiality of the participants' data throughout the study. Any personal identifying information was kept confidential and was only accessible to the research team. Only aggregated and anonymized data were used for analysis and reporting purposes.

Participants were informed about the purpose and nature of the study, the potential benefits and risks involved, and their right to withdraw from the study at any time without penalty. They were assured that their decision to

participate or decline would not impact their future medical care or treatment.

The research team also provided detailed information about the rehabilitation exercises and infrared device being used in the study, including any potential side effects or discomfort that participants might experience. Participants were given the opportunity to ask questions and seek clarification before providing their consent.

Prior to the start of the study, the research team conducted a pilot study to ensure the safety and effectiveness of the rehabilitation exercises and infrared device. Based on the results of the pilot study, necessary adjustments were made to the study protocol to optimize the benefits and minimize potential risks for participants.

Data collection tools

Arab and foreign sources, the Internet, personal interviews, questionnaire forms, office tools, Kenova program for extracting range of motion, an infrared device, a visual analogue form for determining the degree of pain, a muscle force sensor device type (EK3-200) generation (3) (Italian).) Manufacture.

Research tests

A- Muscle strength test (Abdul Hamid, 2016): This is done through a muscular strength sensor device, generation (3). The purpose of the measurement: to measure the muscle strength (extension and flexion) of the research sample.

Unit of measurement: Newton.

Performance instructions

Performance description

Prone - bending the leg backwards.

Description of performance: From the prone position, the injured person extends the leg straight, then a force sensor device is placed on the end of the shin bone from behind, and the injured person is asked to bend the leg backward with maximum force, through which the device's reading is recorded and the best reading is taken.

2-Visual analogy form (Baker 2016).

It is a scale used in many foreign countries to determine the degree of pain at the site of injury. The purpose of the measurement: - To measure the degree of pain.

Unit of measurement: degree.

Performance instructions

The patient is presented with a sheet of paper with a 10 cm long line on it and divided into 10 degrees. The patient is asked to determine the degree of pain he feels while performing the movement of the affected part. Each square has a performance time of 5 seconds (meaning that after the end of the five seconds, the transition is made to The box after it) requires determining the degree of pain that the tester feels while moving the affected part to the maximum extent that can be reached.

Calculating grades: The degree of pain felt by the patient when moving the affected part to the maximum possible extent to reach it is recorded. A grade of zero expresses the absence of pain and a grade of 10 expresses the maximum pain that the injured person cannot bear.

Note: The degree of pain was measured using visual analogy, which was determined and applied by the specialist therapist, and in two modes

First situation

From the prone position bending

The laboratory lies on a bench at a height of (1) meter, with the back straight, the arms next to the body, and the leg in the natural flexed position. The injured person raises the injured leg while it is bent, then remains in this position until the pain is felt. After that, the score is recorded. .

The second position

From the prone position - extension: - the laboratory lies down on a platform at a height of (1) meter, with the back straight and the arms next to the body, and both legs are in the bent position, after which the injured person extends the injured leg and then remains in this position until the pain is felt, and it is recorded. grade in the form. Visual analogy, and the tests used by the researcher were determined after presenting them to a group of experts and specialists.

Motor range measurement test using the (Kenova) program application. The range of motion of the knee joint is measured to measure knee osteoarthritis injuries by measuring the joint angles using the application (Kenova program), which is a program designed to measure the angles to be measured in a way that is compatible with the nature of the sample individuals and the type of injury.

Objective of measurement

Measuring range of motion. Unit of measurement: degree

The laboratory bends the hip joint upward as much as possible by raising the entire leg upward with the greatest possible flexion.

Method of calculating the score

The score is calculated by analyzing the movement of the injured person after achieving the maximum range of motion by flexion that the injured lab can reach without feeling pain.

Exploratory experience. The researchers intended to conduct the exploratory experiment on 2/27/2023 on (2) of the research sample who were not enslaved from the main experiment. Its purpose was to know the conduct of the tests, control the components of the rehabilitation curriculum, and the safety of the devices and tools.

Pretests

The researchers conducted pre-tests on 2/28/2023 on the third auxiliary research sample in the afternoon in the physical therapy hall of the Al-Warith Physiotherapy Center in Karbala. The main experiment was that the researchers presented the rehabilitative exercises after preparing them to a group of experts to confirm their application to the research sample, as it included the rehabilitative exercises. The researchers, after reviewing many Arabic sources and references. Foreign and previous studies on rehabilitation developed rehabilitation exercises, and the purpose of these exercises was to strengthen the thigh muscles (improving muscle strength, reducing pain, range of motion, as well as the time and duration of performing the exercises.

The rehabilitation exercises prepared by researchers and presented in many sources and references include performing exercises accompanied by infrared radiation to rehabilitate women suffering from osteoarthritis of the knee joint, starting from (5/1/2023) until (5/19/2023). The purpose of these exercises is to improve muscle strength. Degree of pain, range of motion, as follows

Duration: (3) weeks.

The qualifying units consist of (9) units, three units per week (Sunday, Tuesday, Thursday).

The time of each rehabilitation unit is approximately (20) minutes, and the division is as follows: -

For (5-7) minutes, the infrared device is taken by the injured person at the beginning of the rehabilitation unit for the purpose of preparing the muscles and warming up in preparation for the start of the exercises. The intensity of the rays and their distance from the site of the injury is determined by the physical therapist. 13-minute qualifying exercises that include the following:

A- Start with static exercises, then dynamic exercises, accompanied by infrared radiation.

B- The sample tries to perform the exercises without assistance.

C- Researchers use a progression of exercises in terms of difficulty in each exercise.

D- The repetitions of rehabilitation exercises should be few and then begin to increase.

E- The researchers will use clarification methods so that the sample members can perform the exercises correctly.

The researchers also took into account, when developing the exercises, targeting the specificity of each muscle, as well as focusing on the fact that the exercises contain auxiliary tools and are graduated between stability and movement and between ease and difficulty, and are comprehensive in terms of the type of exercises and in a way that serves the sample to benefit from the rehabilitation exercises developed to accompany infrared rays.

Statistical method

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. In the normality testing of the data, kurtosis and skewness values of ±1.5 were taken into consideration. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

The researchers conducted pre- and post-tests for the research variables related to the rehabilitation of injured women among members of the research sample and treated the data statistically to achieve the objectives of the research and verify its hypothesis. The results are presented and analyzed below, as I discussed the statistical treatments obtained and adopted their interpretation and support them with scientific sources. Presentation of the results of the pre- and post-tests for the variables of degree of pain,

muscle strength, and range of motion among the research sample.

For the purpose of achieving the goal of the study, preparing rehabilitation exercises in rehabilitating women with knee osteoarthritis and identifying their effect between the pre-test and post-test and for the benefit of the post-test among the research sample. Therefore, the researchers processed the data obtained statistically using (mean, interquartile deviation) and to find out the significant differences between the pre- and post-tests for the group The research used the Wilcoxon test as shown in the tables below. Table (1) Arithmetic means, standard deviations, and T-test value between the pre- and post-tests for the research variables in tests of muscle strength, range of motion, and degree of pain.

Table 1. Comparison of the differences in results of the rehabilitative exercises using infrared rays and knee osteoarthritis

Variables	Pre-Test		Post-Test		T Value	Sig Level	Sig Type
	Mean	Standard Deviation	Mean	Standard Deviation			
Muscular strength	38.665	6.562	51.833	5.845	6.403	0.001	Sig
Motor range	22.333	6.713	7.834	1.166	5.008	0.004	Sig
Degree of pain	51.832	5.846	25.001	3.283	19.848	0.000	Sig

*p<0.05: Abbreviations: MS: Muscular strenth, MT: Aspartate Motor range

DISCUSSION

It is evident from Table (1) and the values for the pain degree test, which showed the values of the arithmetic mean, the standard deviation, and the T-test value, as the mean value for the pre-test was (51.832) and for the post-test (25.000), and the standard deviation value reached (5.846) and the T-test value (19.848) and below a significance level smaller than the significance level (0.05).

Which indicates the presence of significant differences in favor of the post-test. The researcher attributes this to the use of the rehabilitation curriculum prepared by the researcher, which included reducing the degree of pain, improving strength, and range of motion, as it had a positive effect in reducing pain and eliminating it during the rehabilitation stages, and the patients were able to achieve these. Moral values: Due to the correct performance of the exercises, through the direct supervision of the researchers, these significant results were achieved, which were in favor of the effect of using rehabilitative exercises using infrared rays. make the player feel comfortable and relieve pain. Flexibility exercises complement any rehabilitation program and greatly relieve the affected person. Strength exercises also have an effective importance in alleviating and eliminating pain. Therefore, when developing rehabilitation exercises, the researchers focused on using exercises represented by strength exercises, stretching, and the goal is to reduce pain. Pain and to remove it, preceded by infrared rays, which played a role in relieving pain.

Table (1) shows the values of the pre-test for the muscular strength variable if the arithmetic mean value was (38.667) and the standard deviation value was (6.562). After applying the rehabilitation exercises using infrared rays for the muscular strength variable, the results of the post-test were in the arithmetic mean values (51.833) and the deviation value. The standard value is (5.845) and the value of the T-test is less than (0.05). This indicates that there is a significant positive effect between the pre-test and the post-test on the muscle strength variable and for the benefit of the post-test. The researchers attribute the emergence of these results to the rehabilitation exercises that included strength exercises, stretching, and the use of infrared radiation, as they were of great importance in improving muscle strength during the rehabilitation of women suffering from osteoarthritis of the knee. The researchers point out that performing strength exercises had a positive effect in rehabilitating the injured women and trying to return it soon. His

health condition before the injury, and that the muscle maintains its ability to protect itself. It became clear from the results that the curriculum, which contained the exercises that the researchers used, had a moral impact on the time of returning to competitions. recurrence of injury and improving muscle strength (Al-Naja, 2018) emphasizes that rehabilitation exercises must include strengthening exercises.

These exercises aim to increase muscle strength and endurance (Farhan, 2017) also confirms that the importance of muscle strength for health, especially health. The musculoskeletal system and the scientific basis for developing muscular strength is done through the two rules of gradualness and increasing the load, and any type of resistance can be used to achieve this purpose. Whether in the form of free weights, weight training devices, rubber ropes, or exercises in which body weight is used, and to work on engaging the muscles that have the largest space and to regulate special exercises for these muscles in a way that serves the success of the rehabilitation process, and this is what the researchers worked on, as they used tools There are multiple ways to improve muscular strength according to the rules of gradualness and increasing burden. Researchers believe that the improvement in the muscular strength component came as a result of harmonic adaptations in the neuromuscular system, i.e. (regulation of nerve impulses), more than the strength resulting from muscular hypertrophy. This is due to the duration of the rehabilitation exercises, which lasted for (10) weeks Muscular strength exercises help to strengthen the connective tissues in the muscle and protect them from injuries. The stretching exercises used in the rehabilitation curriculum also had an effective effect in increasing muscle strength using several methods in the rehabilitation process for women with knee osteoarthritis (Othman 653, 2018) indicates the positive effect of the flexibility component in improving Muscle strength and its development.

This is consistent with the study (Adeeb, 2015), which recommended that stretching exercises should be accompanied by muscular strength. Therefore, the researchers took into account when preparing the exercises and after they contribute to alleviating pain, which is accompanied by an improvement in the muscular strength that was lost due to the injury, which leads to lack of strength. The ability to move, and this leads to a weakness in the level of working strength in the affected part. The researchers also used a progression in the exercises in terms of performance time and the gradual difficulty and ease of each exercise. This helped in the effectiveness of these exercises and thus improved the strength of the sample members to achieve the goals of the exercises set.

From Table (1), the pre-test values for the range of motion variable appear, as the arithmetic mean value was (22.333) and the standard deviation value was (6.713). The post-test values after applying the rehabilitation exercises using infrared radiation were the arithmetic mean value (7.834) and the standard deviation (1.169). The value of the T-test was (5.008) with a significance level below (0.05), which showed the presence of significant differences, indicating an improvement in the range of motion of the research sample, and that the rehabilitation exercises using infrared radiation that the researchers usedThe researchers were characterized by diversity and progression with the aim of helping the muscle to return to its natural state and through it improving and restoring the range of motion of the hip joint. The intensity of the exercises used was appropriate and within the limits of the affected sample's capacity as well as within the limits of the injury, as obtaining a sufficient amount of range of motion for the muscles of a particular joint, its tendons and ligaments or The group of joints in a particular movement or activity depends on the amount and intensity of exercises performed in a wide range of motion degree of range of motion previously acquired by the individual, and as (Razouqi, 2020) indicates, rehabilitative exercises achieve several goals, including improving the detailed range of motion, and (Muhammad, 2021) shows that rehabilitative exercises work to strengthen the working muscles of the affected part and reach the range of motion. Full joint, after using rehabilitation exercises accompanied by infrared rays, which have proven their effectiveness The researchers reached the following conclusions and recommendations.

The exercises prepared by the researchers and preceded by the use of infrared radiation have a positive effect in improving the muscle strength of women suffering from knee osteoarthritis. The exercises prepared by the researchers and

preceded by the use of infrared radiation contributed to alleviating and improving the level of pain for women suffering from osteoarthritis of Exercise preceded by the use of infrared rays have a positive effect in restoring and improving the range of motion of women suffering from knee osteoarthritis.

As for the recommendations

Guided by the rehabilitative exercises prepared by the researcher in rehabilitating women with osteoarthritis. Use the measuring and testing devices that researchers used when evaluating knee osteoarthritis injuries. Taking into account the psychological aspect during the rehabilitation of injured players in general. Continue to perform some exercises regularly even after completing the rehabilitation curriculum in order to prevent the injury from occurring again. Conduct similar studies in games, samples, and other levels. Conduct similar studies on other muscles, and before that, study the characteristics of these muscles before starting to develop rehabilitation exercises. That is, other variables related to knee osteoarthritis injuries using other methods and methods in addition to exercises.

Appendices

From a standing position, arms in front, the injured person swings the affected leg forward and then backward, with the leg tight. Standing with the arms aside, the injured person swings the affected leg to the sides (right - left), with emphasis on tightening the muscles of the affected leg. From a standing position and using a rubber band, the injured person places the rubber band on the affected leg and pulls the band to the four sides alternately, so that each side has 10 repetitions. From a standing position, leaning against the wall of the pool, with the arms next to the body, the injured person bends the legs so that they are at a 90-degree angle between the thigh and the leg, then remains in this position. From the standing position, resting the arms on the wall of the rehabilitation center, the injured person raises the legs by pushing the ground with the combs and returning them back down. Standing, arms bent, the injured person places the comb of the injured leg on the edge of the chair (it is inside the water), and attempts to go down by bending the leg at the knee joint. The exercise is performed for both legs alternately. Standing in front of a ladder, arms holding the ladder. The injured person climbs only one ladder and ascends with the healthy leg. The the knee. The exercises used with infrared rays have a positive effect in improving the muscular strength of the research sample.

injured leg is then pulled and bent at the knee joint while pulling it and then descending.

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Conflict of Interest

Authors declare no conflict of interest.

Ethics Statement

The interventional study was accepted by Ethics Committee of Al-Warith Center for Physiotherapy (Protocol number- ACP-2024-0338).

Author Contributions

Planned by the authors: Study Design, NHFAH and SAH ; Data Collection, NHFAH and SAH ; Statistical Analysis, NHFAH and SAH; Data Interpretation, NHFAH and SAH; Manuscript Preparation, NHFAH and SAH ; Literature Search. All authors have read and agreed to the published version of the manuscript.

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RESEARCH ARTICLE

The Effect of the Self-Regulated Method on Learning the High Dribbling (Fast) Skill Basketball for First-Year Intermediate Students

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Abstract
The purpose of this paper is to prepare educational units according to the self-regulated method to learn the high (fast) dribbling skill in basketball and to identify its effect for first-year middle school students. The researchers assumed that there is an effect of the educational units according to the self-regulated method in learning the high (fast) dribbling skill in basketball for students. There are statistically significant differences in favor of the experimental group. The researchers used the experimental method in the manner of two equal groups. The researchers identified the population as students from Al-Naqa Secondary School for Boys, one of the schools of the Diyala Education Directorate for the academic year 2023-2024. They numbered (372) students for all grades in it, and the researchers chose the sample from students. The first grade, which has a number of (86) students and a percentage of (24.19%), was selected from Division (A) so that the sample number was (40) students and a percentage of (46.511%). They were divided into an experimental group and a control group represented by (20) students for each group. And (5) students for the exploratory experiment from the research community. The study concluded that the use of the self-regulated method had a direct impact on the students' learning of the high (fast) skill of dribbling basketball for students.

Keywords
Self-Regulating Method , High Dribbling (Fast), Basketball

INTRODUCTION

Those in charge of the educational and pedagogical process tend to employ and use the science of teaching methods in the field of sports, as it is a science concerned with improving the academic level of students, as different teaching methods and approaches are used and experimented to achieve educational goals in educational institutions it is mentioned (Sameer, Rashid & Radhi, 2022). The learners' abilities are multiple and their academic levels vary between each educational stage and another, as well as the teacher's multiple approaches to teaching, requiring the teacher to search for the method that suits each learner and the nature of the teaching environment and the subject. Teaching that provides diverse educational situations taking into account the individual differences of the learners is the appropriate method." To achieve the goals sought by educators (Al-Jburi, Rashid, & Radhi, 2022). Therefore, the need of education for new programs and methods to develop creative abilities and various scientific skills has increased, and there are many methods and methods that contribute to developing creative abilities, the most important of which is the brainstorming method, which is one of the methods of developing creativity in generating the largest possible number of ideas away from evaluation or criticism. Because criticizing ideas or over-evaluating them especially when they first appear may lead to female students being afraid and paying more attention to quality than quantity, thus slowing down their thinking and decreasing the percentage of creative ideas they have (Saleh, Radi, &

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Hashem, 2020). Despite his recent entry into the field of physical education, he has proven his effectiveness and has been able to contribute to providing solutions. For motor problems, as it makes the student search for all motor solutions to the problem that is being posed, using his ability to brainstorm his mind and body with ideas in which he can find a solution.As we talk about modern methods, we must, while trying out the new, compare it with the traditional methods that we are accustomed to studying with, including the imperative method. Which is considered the most widely used method in the fields of education, as this method is characterized by the fact that the students must follow all the orders issued by the teacher at all stages of the lesson, so the students are restricted in the process of performance and commitment to the teacher's instructions and obedience to her (Sameer et al., 2022).

The self-organized method gives a greater scope of individual freedom to the student or learner and depends on cooperation and interaction between the students themselves and gives them the opportunity to rely on themselves in making their own decisions. This results in them accepting self-responsibility for their learning, but not in isolation from the teacher, as the student thinks." In ways that depend on induction, exploration, and creativity through their use of cognitive and metacognitive processes, as this process depends primarily on the student, and this process differs from the traditional method, as the student's freedom of thought is limited and in accordance with the teacher's point of view and what is imposed by the nature of the subject (Garcia & Pintrich, 2012), mastery of its performance is considered the cornerstone of the team because of its importance to the team's progress and scoring points. The team performs the skills when possessing the ball in a coherent, sequential manner, interspersed with the high (fast) dribbling skill that is part of these skills, as all the skills the player performs within On the field, it is nothing but an attempt to create an opportunity to shoot at the opposing team's basket to score winning points. This happens when the student reaches the opposing team's basket legally with the ball, avoiding the mistake of walking with the ball and thus high (fast) dribbling. "Noting that the technical aspects of dribbling are considered easy, and it is easy for every student to master them, by pushing the ball towards the ground using the fingers of the hand as well as the wrist, provided that the movement of the hand is downwards, while ensuring that the fingers are spread over the ball without stiffness, as this leads to To control the ball. It should be taken into account that the player does not constantly look at the ball when changing the dribble to the other hand, but rather must be trained to look at his teammates so that he can exploit the opportunity available to his teammates (Dayem and Hani, 1999).

When mastered, the player avoids the mistake of walking. It is considered an effective offensive means of transferring and moving from one place to another inside the court during play. It is usually used to advance the ball and when there is no teammate within reach or there is no room to use handling to move inside the court toward the opposing team's basket. Since dribbling leads to a push The ball hits the ground with one hand and in a specific direction and bounces it from the ground to one of the hands as well. It requires muscular coordination and repetition to master its performance correctly and with great fluidity. Mastering the basic skills in any sports game and learning skillful and tactical performance is one of the most important goals that the educational process seeks after taking into account the level of the learners and the time specified for the learner to complete the learning process. These are all changing circumstances, as it has become necessary to find new means and methods to confront them." These variables then make the educational process successful and provide learners with skills and mastery of them (Al-Naimi, 2015).

Hence the importance of research on using the modern (self-regulated) method that motivates the student to self-learn the skill, which makes the student master the skill in most playing conditions. "Working in a self-organized manner in a physical education lesson is limited to groups of students in the lesson, which helps students' thinking unleash their creative abilities. In this context, working within a group of students possesses more information and knowledge than its individual members possess, even if one of them possesses information and knowledge." Broadly speaking, another person's information can represent a significant contribution within the group, even if it is modest and individual (Al-Daghini, 1996). The specialists in teaching physical education and the game of basketball,

despite the results and achievements achieved through the use of teaching methods and methods, teachers in secondary schools still rely on the use of traditional methods in teaching basketball skills, including high-level drilling, in order to develop and improve students' performance, and The method of directing the physical education lesson in an accurate scientific form, in secondary schools. A fundamental problem arises related to the failure to use modern methods that rely on the student and make his learning self-paced. The problem of the research lies in the presence of a clear weakness in the level of performance of the high dribbling (fast) skill basketball by first-year intermediate students. Therefore, the researchers decided to conduct a study to identify the effect of the self-regulated learning method on learning to perform the high dribbling (fast) skill basketball for first-year intermediate students. The research objective was identifying the effect of the self-regulated learning method on learning the high dribbling (fast) skill basketball among members of the research sample.

MATERIALS AND METHODS

Research methodology and field procedures

Research Methodology

Research Methodology: The researchers used the experimental method in the style of equal groups, which is considered one of the most efficient means of achieving reliable knowledge, as shown in Table (1).

Table 1. Shows the experimental design

Groups	The first step	The second step	The third step	Fourth step	Five step
	Pretest	Independent variable	Posttest		
Experimental	High dribbling (fast) test	Self-regulated method	High dribbling (fast) test	Mean differences between the pre- and post-test results for the two groups	Mean differences between the two groups in the posttest
Control		Established method			

Community and sample research

The community is "all the items that the variable can take (Al-Sumaidaie et al., 2010), while the research sample is the model "on which the researcher conducts the entirety and focus of his work, and in psychology, education, sociology, and sports science, for example, the sample is the human being" (Mahjoub, 2002).

The researchers identified the research population as students from Al-Naqa Secondary School for Boys, one of the schools affiliated with the Diyala Education Directorate for the academic year 2023-2024, who numbered (638) students for all grades there. The researchers deliberately chose the sample from first-year students, and their number reached (30) students from Division (A). as an experimental group, numbering (15) students, and section (B) representing the experimental group, numbering (15) students (10) students for the exploratory experiment from the same two sections.

This article's necessary ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 23.01.2024 Issue/Decision No: 2024/22. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki , and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

Homogeneity of the research sample:

Through Table (2), it was found that the values of the skewness coefficient were all limited to (+1), and the significance of the differences proved to be insignificant, which made it clear to the researchers that the members of the two groups were equivalent in the variables of height - weight - age.

Table 2. shows the statistical parameters of the variables of height - weight – age

Variables	X	SD	Median	Skewness (±3)
Length – cm	146,83	5,47	146	0,455
Weight - kg	58,71	6,58	58	0,323
Age - year	12,49	1,26	12	1,166

Mean (M), Std. Deviations (SD)

Test is under investigation

High dribbling (fast) basketball Test

Objective of the test: to measure high dribbling skill. Performance specifications: At the start signal, the tester begins to perform dribbling from the corner of the field towards the center line, then turns to cross the field from the center line, and then turns to continue dribbling to the end of the field from the side line, as shown in the figure. Registration: The time for covering the distance is calculated in time and to the nearest (1/100 second) from the beginning, that is, from the start signal until reaching the finish line.

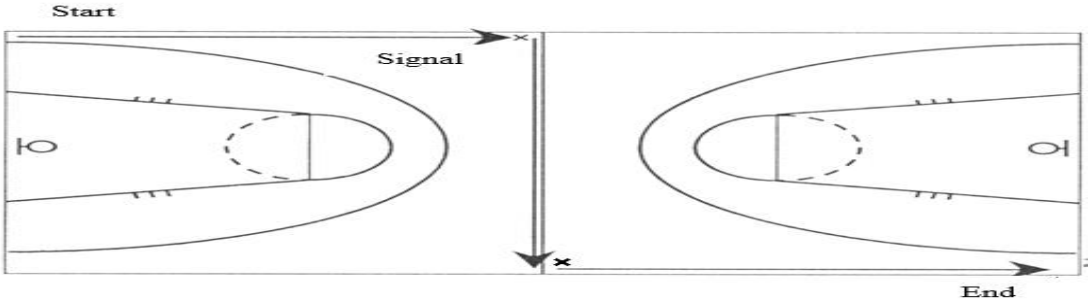

Figure 1. shows the high dribbling (fast) test.

Field research procedures

Exploratory experience

The exploratory experiment is considered a mini-experiment of the basic experiment, and it must have the same conditions and circumstances as the main experiment, as much as possible, so that its results can be taken into account" (Abdul-Jabbar and Bastawisi, 1984).

The exploratory experiment was conducted by the two researchers on the exploratory sample on (Thursday) corresponding to (10/12/2023) at exactly nine o'clock in the morning on the basketball court of Al-Naqa High School, by applying the high dribbling (fast) skill test to identify the suitability of the test for a sample, the validity of the tools, and the knowledge of the supporting work team on how to apply the tests, their sequence, the method of recording, and the length of time to apply each test.

Scientific foundations of the skill under research

After processing the data statistically by using the simple correlation coefficient (Pearson), it was found that all skills have a high degree of stability, as shown in Table (3).

Table 3 . Shows the reliability coefficient for skill tests

Test	Reliability coefficient	Type sig
High dribbling (fast)	0,87	Sig

Table (4) shows the reliability coefficient for the high dribbling (fast) test in basketball, where it was shown that the calculated values of the test are greater than the tabulated value, which indicates that the test results have high stability. As for the equivalence of the sample, which shows that the members of the two groups are on the same starting line in terms of the level of performance

for the skill, the researchers conducted the equivalence of the sample with the pre-test for the two research groups in the high dribbling (fast) skill. The results were analyzed statistically, and Table (4) shows this.

Table 4. Shows the equivalence of the skill test used

Groups		Measuring Unit	Arithmetic means	Standard deviations	T value Calculated	Error percentage
High dribbling (fast)	Experimental	(time/second)	15.77	1.75	1.531-	0.134
	Control		16.58	1.57		

The tabular (t) value at a significance level of 0.05 and the degree of freedom (38) is (2.05). From Table (3), it was found that the significance of the differences is not significant. This indicates that the two groups are equivalent in the level of performance of the high dribbling (fast) skill basketball.

Pre-test of the research sample

Pre-tests for the research sample were conducted for the experimental and control groups on Sunday, 10/15/2023, at Al-Naqa Secondary School for Boys.

Main experience

The first educational unit was conducted in Appendix (1), a model of the educational unit for the experimental group, on Monday, 10/16/2023, and the last educational unit was conducted on Monday, 12/25/2023. As for the control group, the physical education teacher at the school used his usual method. ***Post-tests***

The researchers conducted the post-tests after completing the application of the educational units to the experimental group, amounting to (8) educational units, on Wednesday (12/27/2023) in the Al-Naqa Secondary School Stadium for Boys, taking into account all the conditions, conditions and procedures under which the pre-tests were conducted.

Statistical analysis

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Presenting, the results of the differences between the pre-test and post-test for the high (fast) basketball dribbling skill of the experimental group

Table 5. Skill test analysis results for the experimental and control groups

Skill	Groups	Measuring Unit	Pre-test		Post-test		Difference of the arithmetic means	Differences of standard deviations	Standard error	T value Calculated	Level sig	Type sig
			X	SD	X	SD						
High dribbling (fast)	Experimental	1/100sec	15.777	1.755	14.344	1,889	1.433	1.215	0.272	5.273	0.000	Sig
	Control		16.583	1.570	15.431	1.116	1.153	1.136	0.254	4.537	0.000	Sig

Mean (M), Std. Deviations (SD),
The tabular (t) value is (2.09) with an error rate of (0.05) and a degree of freedom (19)

Table 6. Presenting, the results of the post-tests analysis for the experimental and control groups

Variables	Groups	Arithmetic means	Standard deviations	T value	level sig	Type sig
High dribbling (fast)	experimental	14.344	1.803	2.292	0.028	Sig
	Control	15.431	1.116			

Degree of freedom (38) and tabulation (2.05) with an error rate of (0.05)

DISCUSSION

It is evident from Table (5), as we note the values of the arithmetic means, the standard deviations, and the value of (t) calculated between the pre- and post-tests for the experimental group, as well as the values of the differences for the arithmetic means and the standard deviations for the pre- and post-tests for the high dribbling (fast) skill basketball, as the arithmetic mean value for the dribbling skill reached the high (fast) skill for the pre-test was (15.777) and the standard deviation was (1.755). The arithmetic mean value for the high dribbling (fast) skill for the post-test was (14.344) and the standard deviation was (1.889), while the calculated (t) value was (5.273), and since the (t) values are The calculated score is greater than the tabulated one at the significance level of (0.05), which indicates that there are significant differences between the pre- and post-tests and in favor of the post-test for the experimental group for the high dribbling (fast) skill.

The researchers attribute the reasons for the differences and results of the pre- and post-tests of the experimental group to the effect of the educational units designed according to the self-regulated method for learning high dribbling (fast) skill basketball, and the self-regulated method has a large and effective role in learning and developing the skill, "because the steps of the self-regulated method allow the learner to create Meaningful understanding by linking previous knowledge and integrating it with what has been learned, as these steps begin by presenting a real problem faced by students and then working to analyze it and find appropriate solutions to it through the knowledge and skills that are acquired (Fouad, 2008).

The researchers see the significant differences achieved by the control group between the pre- and post-tests in the research variable, and this is realistic because the method, whatever type, that the subject teacher follows, certainly has a positive role in the students' learning and developing their level of high dribbling (fast) skill basketball, even if this method is It depends on the teacher more than the student. "The bottom line is that the student's role is repetition and practice, that is, the teacher gives the ideas and topics complete and ready for the students, and they do not have to interpret and analyze, but rather apply and practice to master the skill to be learned. This is what confirms when the learner faces a problem or situation, learning occurs (Zaitoun , 2007).

From Table (6) we note the values of the arithmetic means, the standard deviations, the calculated (t) value, and the error rate for the post-test for the experimental and control groups for the high dribbling (fast) skill basketball, where the arithmetic mean value for the high dribbling (fast) skill basketball in the post-test for the experimental group reached (14.344). With a standard deviation of (1.803), as for the control group, the arithmetic mean reached (15.431) and with a standard deviation of (1.116), and the calculated (t) value reached (2.292), while the standard error percentage reached (0.01), since the value of the standard error percentage is smaller than the significance level at (0.05) This indicates that there are significant differences in the post-test between the experimental and control groups, in favor of the experimental group confirms that leadership and decision-making by the teacher and student has a significant impact on positive learning by creating sound positive attitudes that contribute to increasing readiness for learning (Abdul-Jabbar and Bastawisi, 1984).

The possibility of providing sufficient time in this method to practice the skill, and this is consistent with what teaching method experts such as Muston and Peterson have stated that the physical education lesson depends on two important factors, the first is increasing the application time, and the second is providing information and correcting errors (Al-Dairy, 1986). The researchers attribute these results to the effectiveness and impact of the educational units designed according to the self-regulated method used by the experimental group, which helped them outperform the control group. The use of the self-regulated method in its basic stages has an effective and significant positive impact on the development of the level of learning of the experimental research sample because it provides New capabilities that the learner can benefit from, "The self-regulated style is considered an essential factor and the axis upon which learning skills and academic achievement are based. It refers to the self-generated thoughts and feelings and the planned and necessary events that affect the student's learning and motivation. The self-regulated student knows how to learn and be self-motivated, and knows his capabilities and their

limits, and based on This knowledge controls and organizes the learning processes, adjusts them to suit the objectives of the educational task and thus improves the performance of skills during practice. The self-regulated learning method is represented in the process of generating ideas and transforming feelings and actions through self-planning to achieve the learning objectives (Majed Farhan, 2020), states, "One of the positives of this method is that the student can, for the first time, make some lesson decisions, especially those related to application, in addition to giving the student a good opportunity to exchange information with the teacher personally about the skill he is applying" (Al-Deiri and Batayneh 1987).

Conclusions

Through the above-mentioned presentation, analysis and discussion of the results, the researchers reached the following conclusions. The results of the arithmetic means of the experimental group in the pre- and post-tests proved that there are differences in favor of the post-tests, the method used by the teacher helped in learning the high dribbling (fast) skill basketball among members of the control group , the self-regulated method has a positive impact on learning the high dribbling (fast) skill basketball for the benefit of the experimental group members, the educational units, which included skill exercises in the main section and designed according to the self-regulated method, had a positive impact on learning the skill aspect of the high dribbling (fast) skill basketball, better than the method used in school ,and the results and differences obtained by the experimental group and their superiority over the results of the control group are clear evidence of the success of using the self-regulation method by the experimental group.

Recommendations

Based on the above-mentioned conclusions reached by the researchers, the following is recommended: Using the self-regulated method in learning other skills and the technical stages of other sporting events is because this method is one of the modern teaching methods, conducting other similar studies in which the self-regulated method is used on samples of different genders, such as female students , need to pay attention to using the self-regulatory method and encourage those in charge of the educational process to develop their educational and training capabilities ,conducting studies to compare the self-regulatory method with other methods of teaching basketball skills ,and emphasizing the use of modern models, methods, strategies and methods in physical education lessons and moving away from the traditional methods and methods used.

ACKNOWLEDMENT

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Conflict of Interest

The author declare no conflict of interest.

Ethics Committee

This study was performed by adhering to the Helsinki Declaration. ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 23.01.2024 Issue/Decision No: 2024/22

Author Contributions

Study Design, HKA and ZGM; Data Collection, HKA and ZGM; Statistical Analysis, HKA and ZGM; Data Interpretation HKA and ZGM Manuscript Preparation, HKA and ZGM; Literature Search, HKA and ZGM. All authors have read and agreed to the published version of the manuscript.

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Appendix (1)

A sample of educational units for learning the high (fast) dribbling skill.

Experimental group

Self-regulating style

first month

High (fast) basketball skill Dribbling

Unit/first

Week: first

Day and date // 20

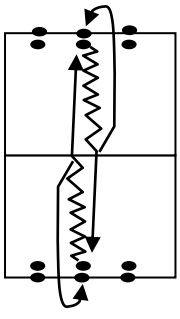
Time: (45) minutes

Educational objectives:

- Accustoming students to discipline and commitment.
- Spreading the spirit of cooperation among students.
- Spreading the spirit of competition among students.

Educational goals :

- Learn the high Dribbling (fast) skill

Type of activity	Time in minutes	Educational goal	performance	Organization	Notes			
					repetition	Rest in between		Total performance time
						repetition	Exercises	
Preparatory part	5minute	Warm up Physical exercises	Running and arm movements	**********	33	3	2	10minute
	5minute 25minute	Educational activity Applied activity	-High (fast) Dribbling performance from stationary mode. -High performance (fast) Dribbling from outside the forbidden area. -Running from the halfway line to the free throw center and taking the ball from the ground and high (fast) dribbling. Ball and numbers exercise (each student carries a specific number in his group. A ball is placed in front of each group. The teacher calls out a specific number. The student runs quickly and catches the ball, then does a high (fast) Dribbling from outside the forbidden zone line.		3 2 2 2 1	30sec 30sec 1minute 30sec 30sec	30sec 1minute	4.5minute 3minute 7minute 2minute 5.5minute 5minute
Concluding part 5minute	10minute		Small game Dismissing					

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RESEARCH ARTICLE

Biomechanical Features of the Double Back Tuck on the Floor Exercises in Gymnastics in Male Artistic Gymnastics

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Abstract
This study aims to identify the characteristics of the takeoff and landing in the round off performance followed by followed by a double back tuck. One gymnast participated in this study, and the data was captured using an camera at a speed of 240 fps and perpendicular to the plane of movement. Data were extracted using the analytical software SkillSpector and Kinovea. The data revealed that the vertical velocity, which was when takeoff (5.9 m/s). This was evident at the maximum height of the center of mass, which was measured (2.3 m). The higher values for the maximum height of the center of mass were the result of a combination of several performance factors, such as the contact angle and the takeoff on the floor with horizontal and faster leg extension. The horizontal velocity at contact was (5.7 m/s) and decreased to (-2.5 m/s) at takeoff. The results of the study indicate that the double back tuck movement involves a reduction in horizontal velocity and an increase in vertical velocity. This is because the horizontal velocity is converted into vertical velocity to raise the body to a great height so that the gymnast can get the time required to execute the skill while flying in the air. The leg muscles also played the dominant role in takeoff and landing through contact angles and takeoff and landing.

Keywords
Artistic Gymnastics, Kinematic, Skillspector, Vertical Velocity, Center Of Mass

INTRODUCTION

The back takeoff is one of the most important and widely used components in gymnastics and can occur at any point in the performance. It is recognized that the gymnast, while flying in the air as a projectile, is subject to the law of ballistics and cannot change the linear or angular momentum during that stage, and the only determinant of the angular velocity around his center of gravity is the value of the moment of inertia of the body around the horizontal axis passing through it only. The success of the gymnast in performing the motor task of the skill depends on his good use of this technique during the takeoff phase (Radhi & Obaid, 2020a).

During the takeoff phase, the gymnast accumulates the linear and angular momentum necessary to perform any somersault and obtains the appropriate takeoff by performing the round off followed by the takeoff movements. The amount of propulsion generated in both the vertical and horizontal directions during the takeoff phase depends on the extent of the athlete's success in developing linear and angular movement during his performance of the round off.

The athlete exploits the outcome of the final linear and angular movement in performing aerobic flips during his flight in the air, which confirms the necessity of both the athlete and the coach understanding the sensitivity of the balance between linear and angular movement when takeoff in order to successfully perform aerobic skills (Payne and Barker, 1976).

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The researcher noticed a scarcity of studies that were concerned with quantitative data on the mechanics of takeoff in aerobic cycles, including the study (Simaliyasky et al., 1976) of the dynamics of the round off skills with the twist and the back handspring and the pike backflip, which was the most important. The results reached by the researcher are that the times of propulsion with the legs and propulsion with the hands allow for an increase in the speed of the body during its flight in the pike backflip.

In addition, a study by (Payne, Barker, 1976), which aimed to compare the forces of takeoff in the back handspring and the back tuck in gymnastics. The study sample included four top-level gymnasts. The most important results of this study resulted in differences between the contact angle in both skills, as the contact angle in the back tuck was (70 degrees), while its counterpart in the back handspring was (48 degrees) with the horizontal plane. A difference was also found between the angular movement About the horizontal axis at the surface of the force platform in each of the two skills, where the angular momentum during the takeoff in the back tuck was greater than the angular momentum when rising in the back handspring.

Bruggemann (1983, 1987), One of the goals of Brueggemann's investigations was to determine the contributions of the arms, trunk, and legs to the total angular and linear momentum of the body. Also use force pads to record ground reaction forces (GRF) during the support phase (touch down to takeoff). The legs and trunk were responsible for the majority of the propulsion exerted on the ground during takeoff. The contribution of the legs was almost double that of the trunk due to their greater mass. Therefore, accurately positioning the legs when touching was of great importance in order to control the angular velocity of the body.

Radhi & Obaid (2020b), reported results from selected gymnastics sequences performed by male and female gymnasts during the 1989 Stuttgart World Gymnastics Championships. They concluded that the most important factors in takeoff for a successful flip were high center of mass and angular momentum. In all cases, the legs played the dominant role in contributing to the total angular momentum during the rise.

Newton et al, (1993) reported on selected biomechanical data for triple back tuck on one gymnast collected as part of an ongoing study in 3D robotic analysis. Their findings showed a 29% increase in vertical velocity when takeoff from double back tuck, which gave a 57% increase in the height reached by the center of gravity, were used in order to verify their performance characteristics.

The landings performed by elite gymnasts during major competitions represent one of the most extreme conditions under which the body must provide adequate force absorption. As a result, landings after advanced skills occur at high speeds and subsequently result in high impact forces. Gymnasts must also meet specific tumbling performance requirements imposed by the rules of the sport. The current FIG code of points (Zschocke, 1993) is the official judge's guide to evaluating the performance of gymnasts and defines landing errors in each event. Situations such as environment (surface) and skill (performance) are related to landing ability (Brueggemann, 1990). The relative contributions of body parts, soft tissue, and bone depending on local fatigue, task constraints, or muscle fitness are responsible for the action of the eccentric muscles that control joint flexion (McNitt-Gray et al., 1993).

Saleh, Radi & Hashem (2020), pointed out that when an object falls, its vertical force, kinetic energy, and momentum are directly related to the distance over which it falls, due to the exponential effect of gravity (Alp and Brueggemann, 1993) measured the pressure distribution and acceleration Foot and leg during landing in gymnastics. Maximum peak foot and leg acceleration was recorded at approximately 49 g.

With regard to landing after jumps from different heights, the force ranges from 3.9 to 11 times the body weight. Significant differences in peak vertical force, time to peak vertical force, landing phase time, and lower extremity kinematics across different drop heights have been reported (McNitt-Gray et al., 1993). There were no statistically significant differences in the peak vertical impact between the soft and hard extensors (McNitt-Gray et al., 1993). On the other hand, the kinematics of the lower extremity showed a significant difference between the extensors of different composition. These results indicate Changes in fall height and mat structure may lead to changes in landing strategies for female gymnasts. In short, there is a wealth of information

and a good understanding of the somersaults requirements.

However, there is much less information regarding the biomechanics of somersaults techniques at all possible skill stages. Therefore, the current study here makes an effort to expand the horizon of knowledge by presenting new facts and ideas. For the above reason, this study was conducted to analyze the takeoff and landing of the back double tuck according to selected biomechanical variables.

Data in the biomechanics literature on landing in gymnasts during competition is limited. During competition, gymnasts must adhere to specific performance guidelines that require them to reduce their body speed to zero with a single foot stance (Brueggemann, 1994, McNitt-Gray et al., 1993). The researchers noticed that Iraqi gymnasts do not perform back double tuck on the floor, due to the lack of sufficient information about their structural composition, which prompted the researcher to conduct this study as in Figure (1). This study aims to identify the characteristics of the takeoff and landing in the round off performance followed by back double tuck.

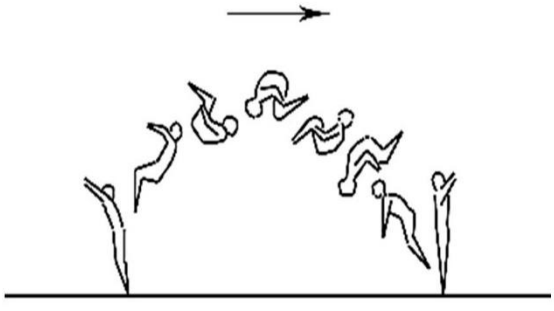

Figure 1. The research skill under study

MATERIALS AND METHODS

Participants

Gymnast participated in this study from the city of Mashhad - Iran and trained in the training center of Khorasan Razavi. The physical characteristics of the player were age 17 years, height 173 cm, mass 60 kg, and training age 13 years. He participated voluntarily and was informed about the course of the study in advance. Signed informed consent before participating in the study (consent was signed by legal guardians of participants under 18 years of age).

The left human body model was defined as a rigid body system connected to 8 pieces of the body with 10 articulation points.

The study was approved by the Ethical Committee of the University of Basra/Student Activities Department and is in accordance with the Declaration of Helsinki. This article's necessary ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 12.02.2024 Issue/Decision No: 2024/12. Regarding vulnerable groups, the authors took into account the needs and priorities of the groups/individuals in which the study was conducted, in accordance by Articles 19 and 20 of the WMA Declaration of Helsinki , and the situation that the study could not be carried out outside these groups and individuals was taken into account. "In this study, additional precautions were taken by the researcher(s) to protect the volunteers."

Data Collection Tool

The gymnast was photographed using an (iPhone 11pro) camera, with a camera speed of 240fps and a resolution of (1080*1920) pixels. The researcher took care that the camera was vertical to the sagittal plane, 5 meters away and 1.50 meters high from the ground. Figure 2.

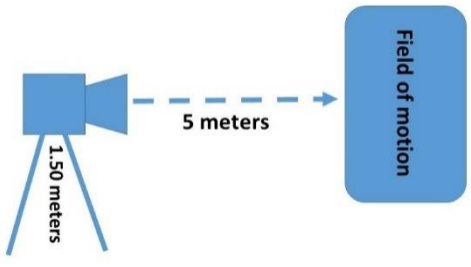

Figure 2. Camera position

In order to conduct biomechanical analysis of the video. Biomechanical analysis was performed by SkillSpector software. The researcher also used Kinovea software to measure the relative angular characteristics at each major position of the body structure. Spatial coordinates were calculated using a 4-point calibration frame at a scale of 2 × 2 m. It was placed in the place where the movement occurred and photographed for transferring it to the motion analysis program.

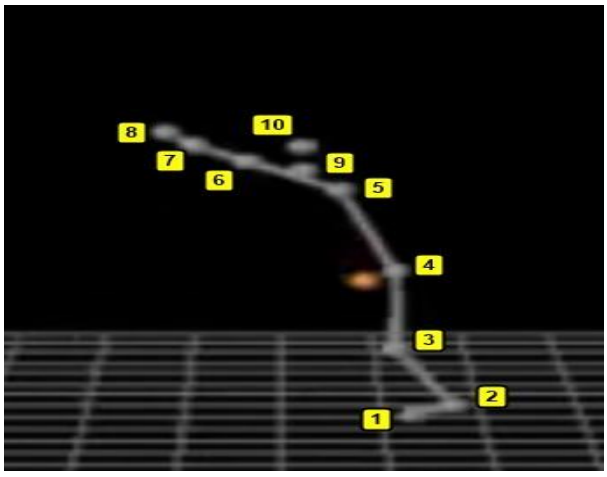

Figure 3. Definition of joints points

Toes (1), Ankle (2), Knee (3), Hip (4),The Shoulder (5) ,Attached (6), Wrist (7), Fingers (8), Palate (9), Top Of Head (10)

Statistical Analysis

SPSS package program was used in the statistical analysis of our research. It was determined by the normality distribution and skewness coefficients of the data. Significance level was determined as P 0.05 and all data were presented as mean standard deviation (SD) unless stated otherwise.

RESULTS

Table 1. Extracted variables for contact moment, takeoff, and landing

Variables	Measurement	value
contact time	second	0.15
Time takeoff	second	0.14
Height center of mass in contact	meter	0.86
Height center of mass in takeoff	meter	1.1
Maximum height of the center of mass	meter	2.3
Knee angle at contact	degree	149.2
Knee angle in takeoff	degree	174.9
The angle of the torso with the horizontal in the takeoff	degree	81.2
The angle of the thigh with the horizontal in the takeoff	degree	91.6
Contact angle with the horizontal	degree	68.6
Angle of takeoff with the horizontal	degree	92.2
Shoulder angle at contact	degree	93.1
Shoulder angle in takeoff	degree	155.8
Vertical speed of contact	m/s	2.3
Vertical speed of takeoff	m/s	5.9
Horizontal speed of contact	m/s	5.7
Horizontal speed of takeoff	m/s	2.5-
Angular velocity of the shoulder	degrees/s	265-
Angular velocity of the hip	degrees/s	307
Angular velocity of the knee	degrees/s	248-
Angular velocity of the ankle	degrees/s	354
Height center of mass in landing	meter	0.85
Vertical speed of landing	m/s	4.96-
Horizontal speed of landing	m/s	2.9
Time from maximum takeoff to landing	second	0.43
Angle of landing from horizontal	degree	85.8
Knee angle in landing	degree	182.8
The angle of the trunk with the horizontal in landing	degree	21.2
Angle the thigh with the horizontal in the landing	degree	80.9

Table 1 shows the results of the linear and angular variables for the study sample and for one gymnast, who was the ideal performer in this study. Figures (2, 3, 4, 5, and 6) show the angles of contact, takeoff and landing, the horizontal vertical velocity of contact, takeoff, and the maximum height of the center of mass, respectively

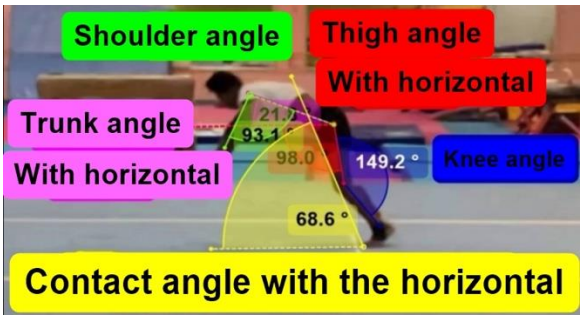

Figure 3. Angles in the contact phase

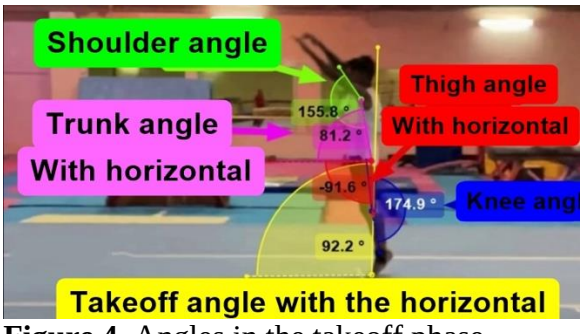

Figure 4. Angles in the takeoff phase

Figure 5. Angles in the landing phase

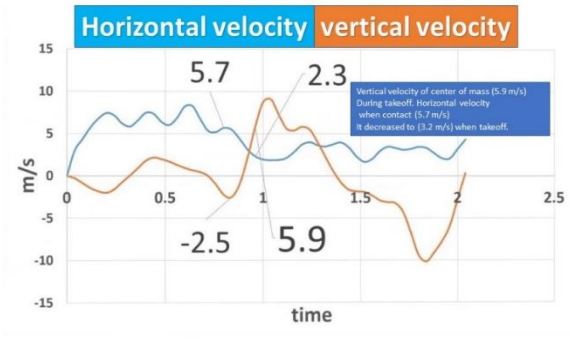

Figure 6. a graph of the horizontal center and takeoff and vertical velocity of the of mass in contact

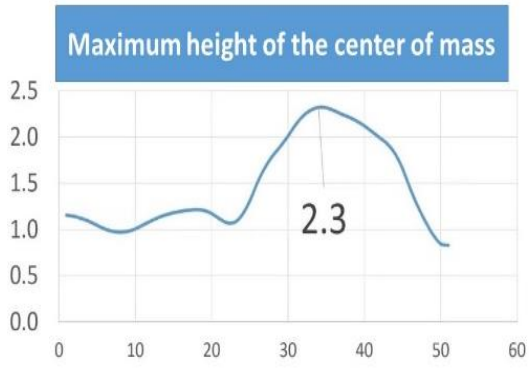

Figure 7. a graph of the maximum height of the center of mass

DISCUSSION

Data analysis showed that the most important performance factor in determining the height of the double back tuck was the vertical velocity, which was at the takeoff (5.9 m/s) as in the figure (6)(7). This was evident at the maximum height of the center of mass and was measured (3.2m). The highest values were for the maximum height of the center of mass. Resulting from a combination of several performance factors such as contact angle, takeoff to the horizontal and faster leg extension. The value of the vertical velocity was higher, compared to the studies previously referred to by (Bruggemann 1983, 1987) of 4.57 m/s, (Shaker, Tuama, & Radhi, 2022) 4.45 m/s, (Newton et al.1993; Shaker, Tuama, & Radhi, 2022) 5.8 m/s. that the leg muscles played the dominant role in takeoff.

The horizontal velocity at contact was (5.7 m/s) and decreased to (-2.5 m/s) at takeoff. The duration of the takeoff phase was (0.15 seconds), and the contact angle was (68.6˚) and in the takeoff (2.92˚). Data analysis revealed that the maximum height of the center of mass before landing was (2.3m) and the height upon landing was (0.85m). The vertical speed at landing was (-4.96 m/s) and the horizontal speed was (2.9 m/s). Knee angles at landing were (182.8˚). The performance showed reasonable extension of the body or kick before landing, and the landing was effectively predicted by appropriate foot placement. The torso-to-horizontal and thigh-to-horizontal angles at landing were (21.2˚) and (80.9˚), respectively as in the figure (3), (4), (5). The time from maximum height to landing was (0.43 seconds).

Double back tuck, which have both linear and angular momentum before takeoff, and during landing, are very difficult to control. The flexible landing surface also increases the challenge and thus makes it difficult to stick to the landing. Therefore, in order to minimize the stress on the musculoskeletal system during the landing, the gymnast must effectively dissipate the large forces he experiences during the landing phase.

The increase in landing phase time due to the maximum height of the center of mass before landing is consistent with the trend observed by (McNitt-Gray, 1991). For technically well-executed double back tuck, the extended position of the joints upon landing with the option to use a large range of joint motion during the landing phase. This may create a large margin of safety, especially if gymnasts need to adjust their strategy during the landing. For example, if the hip joint is flexed before landing, as in a double back tuck landing that lacks to adequate rotation, less movement will be available to the hip joint during the landing phase. If there is not enough movement available in the hip range, the knee joint would be expected to play a greater role.

Conclusion

The results of the study indicate that the double back tuck movement involves a reduction in horizontal velocity and an increase in vertical velocity. This is because the horizontal velocity is converted into vertical velocity to takeoff the body to a great height so that the gymnast can get the time required to execute the skill while flying in the air. The leg muscles also played the dominant role in contact and takeoff. Contact angles, takeoff, and landing played the dominant role during performance double back tuck. The angular velocity of the joints leads to acceleration performance double back tuck.

ACKNOWLEDMENT

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Ethics Committee

This study was performed by adhering to the Helsinki Declaration. ethics committee permissions were obtained with University of Baghdad College of Physical Education and Sports Sciences for Woman Ethics Committee Commission Date: 12.02.2024 Issue/Decision No: 2024/12

Author Contributions

Planned by the authors: Study Design, MMA, QMS and SQN; Data Collection, QMS, MMA and SQN; Statistical Analysis, MMA, QMS and SQN; Data Interpretation, MMA, QMS and SQN; Manuscript Preparation, MMA, QMS and SQN; Literature Search. All authors have read and agreed to the published version of the manuscript.

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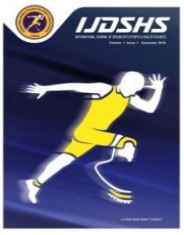

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RESEARCH ARTICLE

Psychological Toughness and its Relationship to Some Coordination, Physical Abilities and Accuracy of Some Basic Skills Performance Among The Iraqi Junior National Handball Team Players

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Abstract
The purpose of this study was to identify the psychological toughness (PT) and its relationship to some coordination and physical abilities, and the accuracy of some basic performance skills of the Iraqi Junior National Handball Team players. The sample consisted of 14 players which constituted 88% of the research community (18) players. The descriptive approach was used to determine the correlation between PT and some coordination and physical abilities, and accuracy of some basic performance skills with single sample design. A questionare scale, consists of 32 items was applied. Coordinations tests included ability of differentiation, ability of suitable differentiation, and ability of connectivity. Physical tests included endurance of the muscules arms, endurance strength for arms, speed power of the leg musclues, the distinctive strength of the arms, endurance of speed, and transition speed. Skill tests included passing and receiving, dribbling, passing, shooting were also applied. The results shows that the players had a high PT and a significant coordination, physical and skill performance (P<.05). All values were found significant (P<.05). The study concluded the need to pay a close attention to the psychological aspects of the team in order to improved the players acheveiments.

Keywords
Psychological Toughness, Coordination Abilities, Physical Abilities, Handball

INTRODUCTION

Provided by the physical side Physical abilities are the requirement of everyone to overcome the requirements of his work in general, but for the athlete it is very important to overcome the course of training or competition. As for the psychological aspect, employing these physical abilities negatively or positively for the course of work, represented by the physical aspect, it depends on the concept of the athlete's psychological toughness and the strength of his endurance to the course and pressures in competition and training. Team sports in which contact with the opponent is possible but under penalty of law. It requires the athlete to be psychologically tough and able to complete competitions or training positively away from negative behavior (Moushriq, 2023) refers that handball players are distinguished by their manly play because they possess the elements of strength and speed, also speed is one of the important compound elements that have an effective effect in most sports (Shirzad, 2015).

Handball is one of the sports that need physical strength accompanied by PT in the performance of the required playing skills under high psychological influence. Therefore, the importance of the research is to know the PT and coordination, physical abilities and their relationship to the accuracy of the performance of some basic skills among the players of the Iraqi

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junior national handball team players with the hand, but the problem is that the players whose strength of toughness and psychological endurance are negative away from good abilities, they cannot deal with situations and events of training or competitions positively.

Many scientific researches have dealt with the psychological and physical aspects of handball, including a study (Samer, 2020), which aimed to identify PT and a relationship between the dimensions of PT among athletics players and concluded - to distinguish athletics players that they possess PT, and that there is a significant correlation between the dimensions of PT (commitment - control - and challenge) among athletics players. As for the study (Haidar, 2022), the study aimed to identify the relationship of PT with the skill of kidnapping, and the researcher concluded that mental toughness has a direct link to the skill of kidnapping with weightlifting among students of the first stage, Faculty of Physical Education and Sports Sciences, Al-Mustansiriya University. Students of physical education and sports sciences have the mental strength that helps them accomplish their sports activities. Including a study (Jinan, 2022), which aimed to prepare skill exercises to develop PT and the skill of shooting from the level of the head, while the most important conclusions were that the skill exercises had a very significant and effective impact in developing PT and the skill of shooting from the head level for young people.

The research objective of the current study is to identify PT and coordination, physical abilities and their relationship to the accuracy of the performance of some basic skills among the players of the Iraqi junior national handball team players. As for the hypothesis of the research, it is a correlation between PT, coordination, physical abilities, and the accuracy of the performance of some basic skills among the players of the Iraqi junior national handball team players.

MATERIALS AND METHODS

The descriptive approach in the manner of correlation relations used to suit the research problem, as the research community was determined by (18) players for the Iraqi junior national handball team players, while the research sample is (14) players and the research sample constituted (88%). The researchers used a single sample design.This case study followed ethical standards according to the College of Physical Education and Sport Sciences University of Baghdad, Iraq (2024).

Table 1. Shows the percentages of sample distribution

Society	Number	Percentage
Research Community	18	%100
Research Sample	14	%77
Exploratory Sample	4	%22

Field Research Procedures

Determining the PT Scale

The PT questionare scale (Al-Azzawi, 2004) consists of (32) items and the paragraphs of the scale are answered according to a four-gradient scale (applies to a large degree, applies to a medium degree, applies to a small degree, does not apply to me), which is equivalent to the degrees (1, 2, 3, 4) and the highest score of the scale (128), the hypothetical average 80 and the lowest degree 32 degrees, and the possession of a high score on the scale indicates a high feeling with PT and vice versa.

Determination of coordination, physical abilities and skills

The coordination tests: ability of differentiation, ability of suitable differentiation, ability of connectivity (Fouad, 2016), physical tests: endurance of the muscules arms, endurance strength for arms, speed power of the leg musclues (Mohamed & Ahmed, 1998) the distinctive strength of the arms, endurance of speed, transition speed (Yahya & Saja, 2016), skill tests: passing and receiving, dribbling, passing, shooting (Kamal & Muhammad, 1980) were applied.

Exploratory experiment

The study was conducted an exploratory experiment on a sample of (4) players from outside the main research sample, in which the scale was applied, as well as skill and physical tests, on 5/2/2023, and this scale and these tests were re-applied on 12/2/2023, about seven days later.

Scientific coefficients of the scale and tests

Honesty

The test is honesty if it succeeds in measuring the extent to which the goals for which it was set have been achieved, and honesty is also defined as the degree of honesty that you approach

with complete success to measure what you want to measure. Thorndike expressed the honesty test by saying that it is the test that measures what you want to measure it with and everything you want us to measure with it and nothing but what you want to measure.

Table 2. Shows the selection and tests of coordination, physical abilities and skills

Abilities and skills	Audition
Ability of differentiation	Passing the ball towards the ring from different heights with the legs together
Ability of suitable differentiation	Defensive movement and dribbling the ball between the cones within (12.21) seconds
Ability of connectivity	Passing, receiving and dribbling the ball around the two cones for (16.62) seconds
Endurance of the muscles arms	Bending and extending the arms from the oblique prone position in (10) times
Endurance strength for arms	Repeat the performance as many times as possible
Speed power of the leg muscles	Partridge farther (right-left) (20) times
The distinctive strength of the arms	Sitting from lying down (20) times
Endurance for speed	Speed Test (30) times
Transition speed	Running in front and back with a distance of (252) m
Passing and receiving	Passing and receiving the ball on the wall from a distance of (4) meters
Dribbling	Dribble test for a distance of (30) m
Passing	Passing test and accuracy of ball guidance from a distance of (30) m
Shooting	Shooting accuracy by high jumping

Honesty of the scale of psychological toughness

To achieve the sincerity of the scale PT, the researcher presented the form containing the aforementioned scale to several experts and specialists in sports psychology and handball, all of whom agreed on the honesty of the scale to apply to handball players.

Authenticity of coordination, physical and skill tests

After most prominent skills and abilities were tested by the experts and specialists in handball, the experts themselves were consulted about the appropriate tests for these skills and abilities, and thus the honesty of the mentioned tests was proved.

Stability

Stability is one of the basic measurement characteristics of the scale, considering the progress of honesty on it, because the honest scale is considered constant, while the fixed scale may not be honest,

Stability of the scale

The stability of the scale has been verified by testing and repeating it and the degree of correlation between the two tests, which shows the degree of stability of the aforementioned scale (0.85) and this indicates the presence of a high reliability coefficient

Stability of tests

The stability of the tests was verified by the test and repeated and the degree of correlation between the two tests. Objectivity: Objectivity is that the test is not affected by the change of arbitrators and that the test gives the same results regardless of the meaning of who evaluates the test and this means excluding self-judgment, as the more objectivity in arbitration, the less subjectivity.

The main research experience

After completing all the scientific requirements of the scale, as well as the tests (coordination, physical and skills), the researcher carried out the research by distributing the forms of the scale PT and conducting the two tests from 12-19/2/2023.

Statistical Analysis

SPSS package program was used in the statistical analysis of our research. It was determined by the normality distribution and skewness coefficients of the data. Significance level was determined as P 0.05 and all data were presented as mean standard deviation (SD) unless stated otherwise. The Pearson correlation test was used to measure the relationship between the various variables in this study.

RESULTS

Table 3. Shows the arithmetic mean and standard deviation of the study variables for the research sample

Variables	N		S	A
Ability of suitable differentiation	14		2.39	.82
Psychological toughness	14		107.5	5.918
Withstand strength for arms	14 Repetition/prolongation		12.85	.7703
With the power characteristic of the speed of the arms	14	Repetition/10 times	9.786	.6993
The characteristic force of speed for the muscles of the legs	14	m/20 times	48.21	3.423
Passing and receiving	14	Repetition/45 times	3.214	.6993
Dribbling	14	Number/60 times	107.5	5.918
Shooting	14	Number/Aim	12.85	.7703

Table 4. shows that there was a positive correlation between PT and ability of suitable differentiation (.773, P<.005).

Table 4. Shows the correlation coefficient and the significance values for PT and the ability of suitable differentiation(coordination)

Variables		Correlation Coefficient	P-Value	Sig.
PT	Ability of suitable differentiation	.773	.005	significant

Table 5 shows that there were positive correlation between PT and strength endurance for arms, force speed of the arms, and the distinctive force of speed for leg muscles, (.593* P<.036; .682**, P<.003; and .692** P<.014, respectively).

Table 5. Shows the correlation coefficient and the significance and values of PT and some physical abilities of the research sample

	Variables	Correlation Coefficient	P-Value	Sig.
PT	Strength endurance for arms	.593*	.036	significant
	The force speed of the arms	.682**	.003	significant
	The distinctive force of speed for leg muscles	.692**	.014	significant

Table 6 shows that there were positive correlation between PT and passing and receiving, dribbling, shooting (.563*, P<.036; .737**P<.003 and 639* P< .014, respectively).

Table 6. shows the correlation coefficient and the values of significance of PT and some basic skills of the research sample

Variables		Correlation coefficient	P-Value	Sig.
PT	Passing & Receiving	.563*	.036	significant
	Dribbling	.737**	.003	significant
	Shooting	.639*	.014	significant

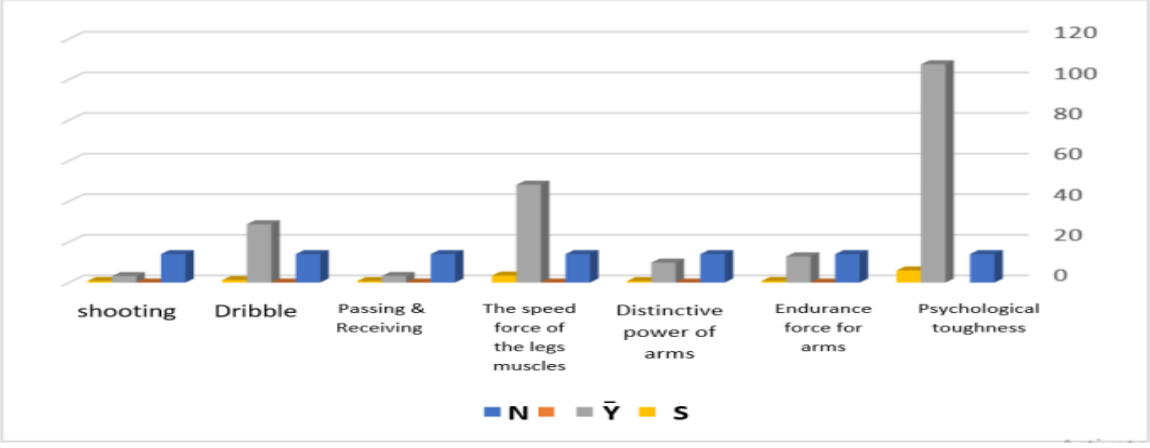

Figure 1. Shows the means and standard deviations in the scale and skill and physical tests

DISCUSSION

Shows the correlation between the PT scale and some compatibility, physical and skill abilities. When a comparison was made between the arithmetic mean of the scale, which amounted to (107.5), and a hypothetical mean of (80), it was found that the members of the research sample of players to whom the scale was applied had a high degree of PT according to the standards of the prepared scale. The researchers attribute the results reached to the nature of the handball game, as the nature of the handball game is a team game in which contact between players is permissible within the limits of the legal rules, in addition to the high physical abilities it requires. It is a high skill performance to obtain the ball, handle it, and aim at the goal. These abilities that are developed as a result of athletic performance, systematic repetitions, and contact with competitors all give players physical toughness in dealing with competitors, which reflects positively on the psychological state of the player, especially PT, toughness may act as an important coping force against the effects of pressure for change (Salehian, 2019), as Hoffman points out that "there is a connection between some compatibility abilities and mental and psychological abilities," as the player's ability to exert an appropriate effort for performance requirements is linked to some psychological variables that support the player to continue performing successfully. Whenever the player is supported by motor and physical experiences, it will reflect positively on his psychological state and continue performing with high confidence and high PT, as both (Esfahankalati and Venkatesh) indicate that there is a correlation between the ability to exert appropriate effort and movement rhythm with the performance of advanced female handball players" (Esfahankalati and Venkatesh, 2013). This is consistent with what (Hassan, 2020) indicated that coordination, physical and skill capabilities "are what make the player more solid and more able to withstand and confront the obstacles and problems that confront him, and to stimulate his latent abilities in all stressful competitive situations, and this is what makes the player more effective in Facing it, because it deals with sources of pressure directly." In addition, PT has an impact on the player's perception of events and on the player's ability to think broadly. This is what (Salman, 2022) pointed out: "PT is the basic element in the process of athletic achievement, and those working in the fields of physical education must benefit from all the influences that affect human behavior and the degree of its severity to find appropriate solutions to them".

The PT variable is one of the psychological variables that contribute to the athlete's ability to confront pressures more positively, resolve them, and prevent future difficulties. It is also considered a general personality trait that is shaped and developed by the environmental experiences surrounding the individual.

As for the relationship between PT and the technical performance of basic skills in all sports, the individual, even if his performance is good, is not sufficient in confrontation without PT and the psychological factor, and this is what (Aymen et al., 2012) indicate that he "needs The learner needs PT when he prepares to learn the skills. This is confirmed by (Jassim & Ismail, 2022) that "good performance alone is not sufficient to achieve victory; rather, there are several factors that control obtaining superiority in the match,

including: the level of competition, the surrounding conditions, and the audience" . In addition to the motivation to win, and these are all matters that fall under the name of psychological factors, as the above factors would tip the balance of the match and help the team overcome the competition. As for the other aspects, represented by the compatibility, coordination, physical and skill aspects, they can be controlled and thus developed by the players as a group according to good training based on modern scientific foundations, psychological toughness is one of the important psychological factors that plays an extremely important and vital role in achieving victories and excellence in the sporting field in terms of psychological and physical readiness" (John et al., 2012).

Believe that PT is not only a psychological trait, but it is also mental, physical, and emotional, and means reaching the optimum and maximum performance of your skills. Likewise, problems of psychological toughness can be easily discovered in the sports field, as they clearly appear through frequent objections from players. On the referee's decisions, or through excessive complaining, objection, and blaming colleagues on the team, as a result of the player being affected by the surrounding circumstances, such as the level of competitors, self-esteem for performance, the atmosphere, the referee, and the audience. By identifying and following up on these behaviors, we can know the extent of the PT of the players and the team (John et al., 2012). In addition, one of the important reasons may be the result of communication between the coach and the players and transferring the coach's ideas to the players and influencing them as a result of the coach's possession of emotional intelligence. Therefore, measuring the emotional intelligence of the sports coach reflects positively on the PT of the players (Fouad, 2023). This means supporting the idea of the goal direction that the coach prepares and sets in both directions (performance and result) for the players (Muhammad, 2022), This is consistent with what(Fouad, 2023) indicated which is that it is necessary to measure the competition communication skills between the coach and the player in order to know the coach's ability to convey feedback to his players, and thus raise psychological toughness in performing the abilities and skills required by the game of handball.

Conclusions

The significant relationship between the PT and the coordination abilities , physical abilites, and perfroemance skills in this study neceeiate the need to foucus on attention to develope the psychological aspects of the players inorder to improve their acheveiment, and vice versa.

ACKNOWLEDGMENT

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Conflict of Interest

We declare that this article we wrote is not involved in any conflict of interest.

Ethics Statement

The writing of this article has gone through all ethical procedures related to the academic realm. All the principles of the Declaration of Helsinki were complied, with special emphasis on informed consent and the vulnerability of the study population.

Authors Contribution

Study Design, FMH, MHS, and MF; Data Collection, FMH, MF, and MHS; Statistical Analysis, FMH, MHS, and MF; Data Interpretation FMH, MHS, and MF Manuscript Preparation, FMH, and MHS; Literature Search, FMH, MFA and MHS. All authors have read and agreed to the published version of the manuscript.

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RESEARCH ARTICLE

Analytical Thinking and its Relationship to the Performance of the Simple Response Skill in Foil Weapon for Students

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Abstract
The purpose of this paper is to identifying the level of analytical thinking and its relationship to the skills of response and simple response to the foil weapon for students of the College of Physical Education and Sports Sciences, University of Basra. Achieving the objectives of the research requires the use of a research method, and accordingly, the researchers used the descriptive method using the survey method .The two researchers identified the research community with the students of the third stage - College of Physical Education and Sports Sciences / University of Basra / for the academic year (2021-2022). Their number is (45) students and the two researchers chose the entire research community to represent the research sample. One of the most important results reached by the researcher is that: There is a significant correlation between the student's analytical thinking and the skills of replying and simple replying ,and the research sample individuals have a good level of analytical thinking, which helps them to perform sports skills, including fencing skills. One of the most important recommendations recommended by the researchers is that: Investing in the level of understanding shown by the research sample of the role of analytical thinking in performing skills, fencing lessons and training should include situations that encourage the use of analytical thinking ,and conducting similar studies and research on university students in Iraq.

Keywords
Analytical Thinking, Performance, Simple Response Skill, Foil Weapon

INTRODUCTION

Starting with the strategic goals and work ethic, it is vital to look for modern and contemporary methods that are compatible with the scale of change and developments that sports institutions face, given the tremendous advancements in management and the changing environment in which they operate. However, developing a set of strategic performance indicators must be prioritized. which, by converting them into a collection of features that represent the performance necessary to be accomplished, conveys in a quantitative form the results and outcomes that must be produced in the short and long term and how they fulfill the objectives that the institution intends to achieve.

A modern and efficient management approach and set of tools that help them acquire a competitive edge and hold onto it for as long as possible, as well as assist them in selecting, implementing, and assessing the strategies they use, are now required due to the growing level of competition among sports teams and among coaches. It goes further since it assists in developing the strategies of the coach, converting them into strategic goals and these goals into strategic measurements that accomplish strategy evaluation and follow-up. All in all, it is a management tool that integrates into an integrated strategic management system (Saeed, 2005).

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Therefore, we find that there is an urgent need for change in work methods and tools so that they can keep pace with the rapid development that is sweeping the world today. There is no doubt that change in work methods and tools necessitates the need for development in the administrative work system and the need to develop their performance, develop their skills, and develop their ideas and personal capabilities (Al-Husseini, 1998) and since the team coach is the top of the pyramid in the training system, he must have qualifications to be able to take the correct decisions and procedures to address errors, therefore, the greatest weight in managing and directing administrative work falls on the team members, to take the team to progress through good strategic performance, and it should improve dealing according to a studied process by issuing decisions on the ground that are compatible with the available capabilities, and in a way that leads to the proper use of these capabilities and their rationalization.

The passion for work is the main driver for every person who wants to succeed. The passionate person is more interested in pursuing his passion than he is concerned with the results. Likewise, the passionate person does not get bored or despair, even if it takes a long time to reach the goals. As it is said (everyone who is passionate about his work is successful, but not necessarily every successful person is passionate about his work), as he has become Searching for what makes people happy, satisfied, and engaged at work is the focus of many researchers and practitioners in the field of career counseling (Mariya & Gitima, 2020).

Love of work, passion for it, and mastery of it are among the basic requirements that guarantee success in any professional field, especially for coaches who are responsible for helping the team achieve victory, as the presence of passion and desire among coaches gives them a strong motivation to be creative in it and master it, which makes us consider that love of work is a... An inevitable path to achieving goals and achieving professional goals that would raise a person's value and achieve a distinctive social and professional status for him, and through it gain the respect of others, and allow him to be an effective element in society, and to be influential in the environment in which he lives, and a provider for him. There is no dependency on him (Geneviève et. al, 2011).

Emotional exhaustion is one of the basic forces that is affected by anxiety or is a result of anxiety, and its most important causes are due to the monotony of daily behavior and the nature and monotony of work, and therefore that behavior and that monotony lead to exhaustion, and exhaustion is a waste of psychological energy as a result of life pressures, and Siderman believes Exhausted individuals often have energy, but their achievement is often less than this energy and their production is less than their capabilities (Othman, 2001).

Emotional exhaustion has been closely linked to psychological pressures, as it represents the highest levels of pressures that affect an individual's various relationships, including the individual's social relationships and interactions with his colleagues and friends, and extends to the family including it, as the phenomenon of emotional exhaustion accompanies the social, economic, educational, sports, and other areas of contemporary life. There is no field that is devoid of this phenomenon, but in varying forms. Workers in various humanitarian and productive professions fall under the influence of psychological fatigue due to the psychological and professional work pressures they are exposed to through their professional practice (Hossam, 2008).

From the above, strategic performance is one of the most important administrative elements that sports institutions must rely on in their work. Striving for advancement, progress, and victory is something that imposes itself on the importance of strategic performance in developing the passion for work among coaches, reducing the level of emotional exhaustion in them, and reaching the best desired goals, and through what Previously, through the researcher's review of previous research and studies, they noticed that there is a scarcity of studies that dealt with strategic performance, passion for work, and emotional exhaustion as a tool for the efficiency of futsal coaches' performance. Hence, the researcher believes that it is necessary to shed light on such a problem as an attempt to identify the strengths of the strategy for sports institutions and their development, as well as to identify the shortcomings and work to remedy them.

MATERIALS AND METHODS

Methods

The researcher used the descriptive method using the correlational method, as it is the appropriate method for the nature of this research. The research community consists of futsal coaches in Iraq registered in the Iraqi Futsal Federation, who number (100) coaches.

Measures used in the research

The researcher prepared measures of strategic performance, work passion, and emotional exhaustion, for the purpose of informing the experts about them and stating their opinion in terms of accepting the paragraphs or not, also if there are paragraphs that need to be modified, deleted, or added, and after confirming the appropriate paragraphs, which received an acceptance rate of more than 80% of the respondents. The opinions of experts and specialists, as the strategic performance scale in its final form consisted of (39) items, with five answer alternatives (strongly agree, agree, neutral, disagree, strongly disagree), and the highest score for the scale was (155) and the lowest score was (31).

As for the work passion scale in its final form, it consists of (30) items and has five answer alternatives (strongly agree, agree, neutral, disagree, strongly disagree). The highest score for the scale was (150) and the lowest score was (30). The emotional exhaustion scale in its final form is (29) and has five answer alternatives (applies to me completely, applies to me often, applies to me sometimes, does not apply to me, does not apply to me at all). The highest score for the scale was (145) and the lowest score was (29).

To determine the items' discriminating potential, the researcher statistically examined the scaled items by obtaining the internal consistency coefficient. In order to do this, Pearson's basic correlation coefficient was utilized. Following their presentation to experts and specialists to ascertain the authenticity of the nominated items, which totaled (39.30) items, and following the collection of all paragraphs were found to be legitimate when the researcher employed the (Ki^2) test to separate valid items from others. This is because the (Ki^2) value that was determined for these locations was approved since it was less than the tabular value of (3.84) at a significance level of (0.05) and a degree of freedom of (1). About the stability of the test (the scale), all metrics elements provide proof of the scale's apparent validity (the test that delivers near results or the same results if performed more than once in comparable conditions). After a week, the test was repeated using the same measurements on the same sample under the same settings, with the researcher using the two scales to the statistical analysis sample with 25 trainers. Using the basic Pearson correlation coefficient, the researcher was able to determine the reliability coefficient for the assessment form. The result was 0.80, 0.88, and 0.85, which is a positive indicator of the measures' stability.

Scientific foundations of standards

Reliability coefficient

Utilizing the test and retest approach, reliability was determined. The exam was administered to a sample of twenty-five trainers by the researcher to make sure the measurements achieved a high degree of dependability. A week later, the identical sample and circumstances from the first test were used for the reapplication of the test. The data were then compared using a basic correlation coefficient calculation. The first and second tests to determine the reliability coefficient between them Table (1)

Table 1. shows the calculation of the reliability coefficient for the measures (strategic performance, work passion, emotional exhaustion)

Statistical	Calculated value	Tabular value	Sig level
Strategic performance	0.80	0.63	0.05
Work Passion	0.88		
Emotional exhaustion	0.85		

It was shown through Table (1) that there is a high, statistically significant correlation between the first and second tests of the measures (strategic performance, passion for work, emotional exhaustion) among the research sample, as the value of the reliability coefficient reached (0.80) (0.88) (0.85), respectively, and they are It is greater than the tabular value of (0.63) at a

significance level of (0.05) and a degree of freedom (22).

Validity coefficient

The validity of each of the scales was verified by establishing content validity by presenting the scales (strategic performance, passion for work, and emotional exhaustion) to a group of experts and specialists in the field of management and organization science and sports psychology, and after reviewing the experts' answers to the scales' items and their suitability. For the research sample and the Iraqi environment, it was found that there was complete agreement (100%) on all items. On this basis, the validity of the test was confirmed and the standards were adopted in the research.

Objectivity

For the purpose of extracting the objectivity of the standards, the researcher applied the tests to the same statistical analysis sample, which consisted of (25) members. The researcher appointed (arbitrators) to mark the results of the two tests, as shown in Table (2).

Table 2. shows an objective calculation of the measures (strategic performance, passion for work, emotional exhaustion)

Statistical	Calculated value	Tabular value	Sig level
Strategic performance	0.85	0.63	0.05
Work Passion	0.89		
Emotional exhaustion	0.86		

Through Table (2), it is clear to us that the values of the correlation coefficients for each of the measures (strategic performance, work passion, and emotional exhaustion), which amount to (0.85) (0.89) (0.86), respectively, are statistically significant and are greater than the tabulated value of (0.63).) at a significance level of (0.05) and a degree of freedom (22).

Statistical method

A statistical program was used in the statistical analysis of the data obtained. Arithmetic mean, standard deviation, frequency, minimum and maximum values were used in statistical representations of the data. Independent Samples T-test were used in the analysis of normally distributed data.

RESULTS

Table 3. shows the arithmetic means, standard deviations, and contortion coefficient for the scale of strategic performance, work passion, and emotional exhaustion among the research sample.

Statistical	X	SD	Skew ness	Distribution
Strategic performance	130.45	6.433	0.617	Equinoctial
Work Passion	129.4	9.249	-0.194	Equinoctial
Emotional exhaustion	73.1	5.853	0.051	Equinoctial

Mean(X), Std. Deviation (SD)

It is clear from Table (3) that the values of the skewness coefficient for the standards ranged between (0 - 0.937), which is less than ±1, and this indicates the moderate distribution of the sample in these variables.

Table 4. shows the arithmetic means, standard deviations, and values of correlation coefficients between strategic performance and work passion among the research sample.

Strategic performance		Work Passion		Calculated correlation coefficient (R) value	t value	Sig type
X	SD	X	SD			
130.455	6.433	129.4	9.249	0.777	4.451	Sig

Mean(X), Std. Deviation (SD)

The tabular (t) value reached (160.2) below the significance level (0.05).

Table 5. shows the values of the means, standard deviations, and values of the correlation coefficients between strategic performance and emotional exhaustion among the research sampl.

Strategic performance		Emotional exhaustion		Calculated correlation coefficient (R) value	t value	Sig type
X	SD	X	SD			
130.455	6.433	1.73	853.5	758.0	191.4	Sig

Mean(X), Std. Deviation (SD)

The tabular (t) value reached (2.160) below the significance level (0.05).

Table 6. shows the value of the correlation coefficient between strategic performance, work passion, and emotional exhaustion among the research sample.

Statistical	Calculated correlation coefficient (R) value	Tabular value	Sig level
Strategic performance Work Passion Emotional exhaustion	751.0	104.4	Sig

The tabular (t) value reached (2.160) below the significance level (0.05).

DISCUSSION

It is clear from Table (4) that this indicates the existence of a statistically significant correlation between strategic performance and work passion. The researcher attributes this to the fact that futsal coaches have good strategic performance in the process of evaluating ideas that seek to develop the training process through work procedures and systems. Maintaining good relations between the administrative body, which is based on the principle of cooperation and integration in completing tasks through the influence and individual considerations that they have to perform tasks and duties without supervision. They are also characterized by sufficient skill and ability to adapt to changes and developments (Fahd, 2023) .This indicates that they bear responsibility and work to achieve their goals despite adherence to the federations system, and they bear the pressures and risks in order to advance the team and its development. This indicates that their policies and procedures are fairly clear, and they have a clear commitment to them, and this in turn leads to the completion of the tasks assigned to them and helps in achieving Achieving the passion for work that contributes to achieving the goals of sports clubs. The researcher believes that the role of strategic performance and passion for work leads to the responsibility of head coaches in achieving the goals of sports teams and working on their advancement and emphasizing their data (Fahd, 2024) . The higher the strategic performance, the greater the passion for work they have. This result can be interpreted according to what was stated in the theory of the dual model of passion by Florinda et al., 2003. The passion for work is a state of continuous desire that depends on cognitive and emotional evaluations of the work, so here the research sample has a high level of passion for work (Nayef, 2007).

That is, it gives high-level evaluations, not their work, and this depends on their performance of their job or work, as it is an important goal obtained after long suffering, especially in our society, as there are great difficulties facing coaches in obtaining an opportunity after waiting that may reach many years, so it consists They have a high-level desire for their work and then a feeling of passion towards their work and jobs, and they consider training the way through which they advance their lives. Through its financial returns, the individual can meet his needs in life and have a family and make him able to meet its requirements, and then he feels satisfied and passionate about working for training and proving their worth. Achieving achievement and victory for sports teams and taking first places in tournaments (Fahd, 2024).

It is clear from Table (5) that this indicates the existence of a statistically significant correlation between the role of strategic performance and emotional exhaustion. The researcher believes that it is difficult to reduce emotional exhaustion without the presence of strategic performance. We note that coaches have emotional exhaustion to a low degree, and this result differs from what was stated below. In the results of the study (Ramirez, & Marin, 2005) and the study (Hui & Jen, 2004).

This result can be interpreted according to what was stated in Hobfel's (Al-Husseini,1998) theory, which emphasized that a person reaches a state of emotional exhaustion when he feels that he has lost or is threatened with losing or losing all his resources, and that trainers, specifically in Iraqi society, despite the pressures and challenges In the work environment, however, paying attention to the human and emotional side and giving it priority at work is important because we are an Islamic society that deals with people as human beings before anything else (Al-Jubouri, & Hussein, 2022) , as coaches take care of the team members, including the players and the administrative and technical staff, when they face a problem such as losing a loved one or being exposed to health problems or circumstances,poor social or psychological well-being they take this into consideration by tolerating his repeated request for leave or the decline in his performance, which gives us an explanation for the fact that trainers in our society have not exhausted all their energies and emotional resources from all aspects, whether at work, home (Gephar & Marsick, 2016) or society, as the emotionally exhausted person "reaches a stage of exhaustion." The energies are exhausted and no longer able to provide more. Thus, cases of emotional exhaustion can be dealt with proactively by working according to performance strategies designed to reduce team loss and confront problems by teaching emotionally exhausted individuals to reframe and evaluate situations as difficult and not stressful (Saeed, 2005).

Table 6 shows the presence of a statistically significant correlation between strategic performance, work passion, and emotional exhaustion. The researcher attributes this to the fact that strategic performance is one of the main pillars of work passion, as there must be dedication to work, prepared motivation, and the ability to Developing passion for work and love for achieving the work of sports club federations, as coaches in federations must possess several characteristics such as intelligence (Hui, 2004), talent, and the ability to analyze the problems and situations facing the work and make every effort to achieve the goals of sports team federations and feel pride and conviction for their work and their commitment to working in it. Whenever these characteristics are available, they will obtain a high degree of passion for work. The availability of both strategic performance and passion for work work to reduce emotional exhaustion, which in turn contributes clearly to improving training work and practices. This result is consistent with what was indicated by (Marsick & Gephar2016) that the presence of strategic performance and passion for the work of coaches of futsal teams is a necessity for advancing work and unleashing creative capabilities that allow launching into creative horizons and fields.

Conclusions

There is a connection between the role of strategic performance and the passion for work among futsal coaches**.** There is a connection between the role of strategic performance and passion for work in reducing the level of emotional exhaustion among futsal coaches.

Recommendations

Enhancing the role of strategic performance and passion for work among futsal coaches. Maintaining good working relationships between union members based on the principle of cooperation and integration in completing tasks. Thus, they can control the level of emotional exhaustion by supporting or rejecting values that have a significant impact on the training process.

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Conflict of Interest:

There is no personal or financial conflict of interest within the scope of the study.

Ethics Committee

This study was performed by adhering to the Helsinki Declaration. Ethical approval of the study was obtained from University of Baghdad, Iraq Ethics Committee at the board meeting dated 06.02.2024 and numbered No:24

Authors Contribution

Study Design, SFR, HQM and IAHN; Data Collection, SFR, HQM and IAHN; Statistical

Analysis, SFR, HQM and IAHN; Data Interpretation SFR, HQM and IAHN ;Manuscript Preparation, SFR, HQM and IAHN; Literature Search, SFR, HQM and IAHN. All authors have read and agreed to the published version of the manuscript.

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