



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2023; 8(2): 78-83

© 2023 Yoga

www.theyogicjournal.com

Received: 03-05-2023

Accepted: 04-06-2023

Dr. Ahmed Walid Abdel Rahman
Professor, Faculty of Physical
Education and Sport Sciences, Al
Mustansiriyah University, Iraq

Dr. Hardan Azeez Salman
Professor, Faculty of Physical
Education and Sport Sciences, Al
Mustansiriyah University, Iraq

The effect of special exercises according to biomechanical indicators to develop some physical abilities and shooting accuracy from jumping high for young handball players

Dr. Ahmed Walid Abdel Rahman and Dr. Hardan Azeez Salman

Abstract

The two researchers discussed the importance of using modern training methods in training and special exercises according to some biomechanical indicators and their effectiveness in developing physical abilities, which in turn reflects positively on the development of shooting accuracy, which is one of the basics on which shooting skills are built in the handball game. During the researchers' observation that they are experts in biomechanics and handball, and through the field follow-up of the youth league, they noticed that there is a fluctuation in the technical performance of the shooting accuracy of these players, which is represented by the lack of use of special exercises according to some biomechanical indicators, which enables them to do their best in training and competitions. Special exercises for some physical abilities according to some biomechanical indicators and knowing their effect on the performance of shooting accuracy from jumping high for young handball players. Among the objectives of the study (preparation of special exercises according to some biomechanical indicators for the development of some physical abilities and shooting accuracy from jumping high for young handball players) and the research hypotheses: (The special exercises used according to some biomechanical indicators have a positive effect on the development of some physical abilities and shooting accuracy from jumping high for players youth handball). The research sample consisted of Al-Jaish Club players for the youth category, ages (17-19) years, the trial period was from 10/12/2022 to 20/4/2023. The conclusion included conclusions, including (the organization of the performance and application of special exercises according to some biomechanical indicators of the curriculum prepared by the researchers among the research sample individuals contributed to raising the level of performance of some physical abilities and the accuracy of shooting from jumping high in handball, and this appeared through the post-results) and recommendations, including (the need for attention With the skill of aiming from jumping high as one of the most important and difficult offensive skills, in addition to that it creates more compatibility for the player by increasing the accuracy during shooting).

Keywords: Special exercises, biomechanical indicators, physical abilities, shooting accuracy

1. Introduction

Due to its exciting, strong, and fast physical and technical performance, handball started to catch the attention of many fans and researchers during a time when team sports saw a remarkable growth in many physical, skilled, tactical, and psychological elements.

The rationing of training—its loads, adequacy, types, and goals—has become one of the important issues sought by those concerned with the sport of handball, which has received special attention from experts and specialists working in its field because international levels require the use of modern and appropriate training methods.

Various sports need different levels of physical preparation and motor performance proficiency, and special workouts may help with both. Based on the combination of motor performance of strength and speed, Muhammad Hassan Allawi described them as "sports actions that are comparable in composition." (16:22)

Moreover, because physical capacities are among the fundamental requirements for performance in the handball game, as a result of the execution of the fundamental skills in the game, especially the offensive ones, if the team possesses good offensive skills (such as

Corresponding Author:

Dr. Ahmed Walid Abdel Rahman
Professor, Faculty of Physical
Education and Sport Sciences, Al
Mustansiriyah University, Iraq

handling, receiving, hitting, and shooting), it becomes a crucial factor in achieving victory in the match, so it must be cared for and developed. And the use of all the latest innovations to improve it, since this will boost morale and provide a necessary motivation to launch an assault.

Preparing the player skillfully aids in the development of his performance, particularly in competitions, whereas a player who is not prepared skillfully struggles to maintain a consistent level of performance in either training or competitions, and improving his skill is one of the most important pillars of training that depends on it in developing the level of the player in training and competition. As the young player must limit the repetition of these exercises during the period of special preparation, and as the element of suspense and competition is included to create a competitive atmosphere among young players during the practice and application of practical exercises for basic skills, training by trainers on complex skills and similar to game situations helps in improving the skill capabilities of the players.

By keeping tabs on two researchers, one of whom is a trainer in the sport in question, and the other of whom is an academic in the field of physical education and sports sciences, we can better understand the impact of various training methods on a variety of physical abilities and shooting accuracy derived from vertical jumps in the sport of handball. Young handball players' recent successes.

1.1 Research problem

Through the observation of the two researchers being one of the academics in the College of Physical Education and Sports Sciences, in addition to the fact that one of them is one of the coaches in this game, and through the field follow-up of the youth league, it was noticed that there is fluctuation in the performance of some physical characteristics and the accuracy of shooting for these players, which is represented by the lack of use of special exercises according to the biomechanical indicators of some Physical abilities and shooting accuracy from jumping high, which enables them to do their best in training and competitions, so the researchers decided to study this problem by preparing special exercises and knowing their impact on some physical abilities and shooting accuracy from jumping high for young handball players.

1.2 Research objectives

- 1- Preparing special exercises according to biomechanical indicators for the development of some physical abilities and shooting accuracy from jumping high for young handball players.
- 2- Identifying the differences between the pre and post tests of the research sample with the effect of special exercises according to biomechanical indicators on some physical abilities and shooting accuracy from jumping high for young handball players.

1.3 Research hypotheses

There are statistically significant differences between the pre and post tests of the research sample in the effect of special exercises according to biomechanical indicators in some physical abilities and shooting accuracy from jumping high for young handball players in favor of the post tests.

1.4 Research areas

- 1- The human field / youth players of the Army Club, ages (17_19) years.

- 2- The temporal field / the period from 10/12/2022 to 20/4/2023
- 3- The spatial field / Al-Jaish Sports Club hall.

2. Research methodology and field procedures

2.1 Research Methodology

The suitability of the chosen approach with the nature of the research problem to be solved is one of the basics of scientific research, and the experimental approach was used in this research in the method of one experimental group, as the experimental approach includes "an attempt to control all the basic factors affecting the variable or the dependent variables in the experiment except One factor that the researcher controls and changes in a certain way with the aim of determining and measuring its effect on the dependent variable or variables. (1:194)

2.2 The research community and its sample

The selection of the sample is one of the important pillars in the main scientific research process, as it "represents the community of origin or the model on which the researcher conducts the entirety and focus of his work." (18:181)

The researcher chose the research community by the intentional method of youth players in handball for the sports season (2016/2017), to represent the research community.

2.3 The means, devices and tools used in the research.

2.3.1 The methods used in the research

- Arabic and foreign sources.
- (Easy Sports - Graphics2.Handball Demo) program for drawing tests.
- Examination nomination questionnaire.
- Skill tests and test registration form.
- Personal interviews of experts and specialists.
- Assistant Work Team.

2.3.2 Equipment and tools used in the research.

- Compag 610 Chinese electronic calculator (1).
- 2 FOX whistles.
- Signs of 12 persons.
- Chair number (1)
- Medicine ball weighing (3) kg
- fixing belt.
- Measuring tape.
- Chalk.
- 2 Chinese-origin electronic stopwatches.
- Handballs (12) No. (3).

2.4 Research tests

A test of throwing a medical ball weighing (3) kg with the hands from a sitting position on a chair. (106:15)

The aim of the test: to measure the explosive strength of the muscles of the arms.

Equipment and tools: a medicine ball weighing (3) kg, a tape measure, a chair with a tight fixation belt for the torso. ·

Method of performance: the tester sits on the chair and the medicine ball is carried by the hands over the head and the torso is adjacent to the edge of the chair. Figure (1), each laboratory is given three attempts and the best one is recorded. ·

Scoring: The distance between the front edge of the chair and the closest point the ball touches on the ground is calculated.

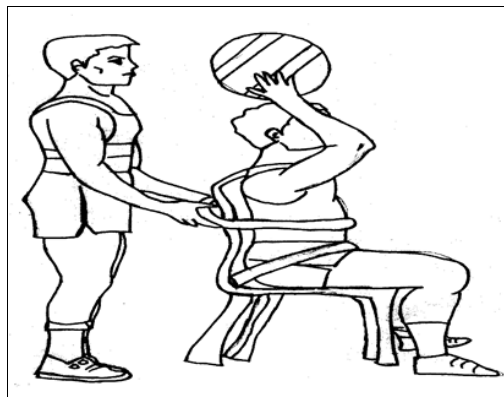


Fig 1: Shows the test of throwing a medicine ball weighing (3) kg from behind the head from a sitting position on a chair

2. Long jump stability test (13:176)

The purpose of the test: to measure the explosive force of the two men

Tools needed:

- A place for jumping divided in meters and centimeters to the end of the field.
- Measuring tape.
- Cut the signs.

Description of performance: The tester stands behind the starting line with the feet slightly apart and parallel, then the tester starts swinging the arms backwards with the knees bent, then jumping forward for the maximum distance possible by extending the knees and pushing the feet with swinging the arms forward.

Score calculation: The measurement is from the starting line until the last part of the body touches the ground, and each attempt is measured to the nearest (5 cm) and the best attempt is calculated for the laboratory.

Arm flexion and extension test from the prone position for 10 seconds (11:71)

Hypothesis of the test: Measuring the strength characteristic of the speed of the arms

Tools needed:

- Stopwatch
- Whistle

Performance description: From the supine position, bend and extend the arms as many times as possible for 10 seconds. the conditions:

- The body took the correct inclined prone position.
- The chest should be touching the ground while bending the arms and then fully extending them.

Scoring: Records the tester with the number of times the flexion and extension are performed within 10 seconds.

Testing the accuracy of aiming from jumping high (8:508)

The purpose of the test: the accuracy of aiming from jumping high.

Tools

(12) handball, a high jumping device with a height of (150 cm), and the distance between the posts is (2 m), a curtain of cloth or strong wire that covers the goal completely, with (4) openings, each of which is (40 x 40 cm) representing the four corners of the goal, The jumping device is placed on the 6-meter line, and the start of the movement is 11 meters from the goal.

Performance method: The player stands behind the starting line (according to the shooting hand) and directly in front of the jumping device standing holding the ball. The player begins to take (2-3) steps and then shoots by jumping high to square (1) then to (2) then to (3) and then to (4). The performance is repeated (3) times, i.e. (12) balls, three of which are directed to each of the four squares, as in Figure (2).

Rules: not to take more than three steps.

Registration: A point is counted when the ball enters the square designated for the shot.

It counts as zero for a shot outside the square.

The result of the shot from which the player moves more than three steps is not counted.

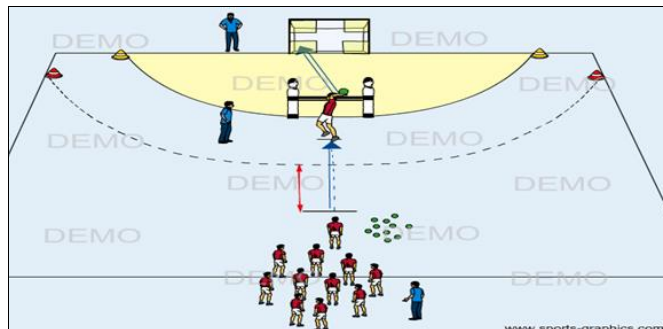


Fig 2: Shows the performance of the shooting test from the high jump

2.5 Exploratory experience

Most researches and studies emphasized the importance of the researcher's exploratory experience by identifying obstacles and avoiding them in the main experiment. On a sample of the research community, who number (3) players, and they are from outside the research sample, on Sunday (12/20/2022), to find out the ability of the sample members to perform the tests used as well as.

Knowing the size and number of the assistant work team and ensuring the validity of the tools and devices used in the research.

- Identify the time taken to perform the tests.
- Ensure the appropriateness of the tests for the individuals of the research sample, taking into account the safety of the players.
- Avoiding errors and obstacles that may appear when carrying out tests in order to overcome them in the main experiment.
- Training assistants on how to apply tests and how to record grades.

2.6 Scientific transactions for tests (honesty, reliability, objectivity)

Validity of the test: The two researchers relied, in extracting the validity of the test, on apparent validity, as they are standardized tests used by more than one researcher and are frequent through many specialized sources in the field of the game.

Test stability: The researchers used the re-test method to find the reliability coefficient, as the tests were applied to the participants in the exploratory experiment on Sunday (12/20/2022), and the test was repeated after (5) days under the same conditions, and the results were as in Table No. (1).

Objectivity of the test: The researchers used arbitrators for the purpose of giving a real evaluation of the tests and through

the application of (Pearson's) law, it became clear that all the tests were of high objectivity, as shown in Table (1).

Table 1: A table showing the reliability and objectivity coefficients of the physical, functional and skill tests applied to the research sample

T	The exams	Constancy	Objectivity
1	The explosive force of the muscles of the arms	0.90	0.95
2	The explosive power of the two men	0.87	0.85
3	The strength characteristic of the speed of the arms	0.92	0.97
4	The aiming accuracy of the jump	0.903	0.893

2.6 Pre-tests

The researchers conducted pre-tests for the research sample for some of the physical characteristics and shooting accuracy included in the study, at the Al-Jaish Sports Club hall on Friday 12/25/2022, and the test conditions were taken into account in terms of the time and place of implementing the tests, as well as the tools used and how the tests were implemented, in order to be The conditions are as similar as possible to those for the post-tests.

2.7 The special exercises used in the research.

- The two researchers prepared special exercises within the framework of the training curriculum for the special preparation stage on the basis of the exploratory experience that they carried out, taking into account the available capabilities and the general level of the research sample, basing its preparation on the scientific foundations of sports training and some scientific sources and references, and the training curriculum focused on comprehensiveness in developing some characteristics Physical and shooting accuracy of young handball players according to some biomechanical indicators.
- Special exercises were applied on (Saturday) corresponding to 12/26/2022 AD until (Sunday) corresponding to 3/26/2023 to the experimental group. The training units were subjected to direct supervision by the two researchers with the assistance of the team coach.
- The training curriculum included (12 weeks) during the special preparation stage that precedes the competition stage, with (4) units per week (Saturday, Monday, Tuesday, Thursday), thus the total number of training units reached (48) units throughout the period of application of the training curriculum.
- The training unit was divided according to the three

sections of the unit, which are the preparatory, main and closing sections.

- The duration of one training unit ranged between (90-120) minutes, as the share of the preparatory section was (20) minutes and the main section was between (65-90) minutes, the share of the special exercises was between (40-75) minutes, and the closing section (5) minutes.
- The researchers adopted the method of interval training (high and low intensity) and the method of repetitive training in developing some physical capabilities and shooting accuracy from jumping high according to some biomechanical indicators for young handball players, as Ahmed Oreibi confirms that “interval training is a method aimed at improving speed and distinctive strength With speed, as well as developing the characteristic of prolonged speed, as this method is similar to what the handball player does in the match, as the player runs, then rests, then runs, and so on...” (4:194)

2.8 Post-tests

The two researchers conducted the post-tests on Tuesday 3/28/2023 in the hall of the Army Sports Club, after completing the implementation of the special exercises with all its units amounting to (48) units, and the researchers provided the same conditions in which the pre-tests were conducted.

2.9 Statistical means

The researchers used the ready-made program in the statistical bag (spss) in the statistical treatments.

3. Presentation, analysis and discussion of the results

The two researchers presented, analyzed and discussed the results they reached to identify the reality of the effect of special exercises according to some biomechanical indicators on some physical characteristics and the accuracy of shooting in handball.

The results were analyzed in the light of the statistical laws used in the research and the appropriateness of this data in order to achieve the hypothesis of the research in the light of the applied field procedures that the researchers used to reach this data, and then discuss it according to scientific references.

3.1 Presentation of the results of the tests, some of the physical characteristics and the accuracy of shooting in handball, before and after, for the members of the research sample.

Table 2: Representing the arithmetic means, standard deviations, and the value (T) calculated for the pre and post tests of the research sample members for the research variables.

Variants	Pre-test		Post-test		T	Pretest	Post-test
	s	p	s	p			
The explosive force of the muscles of the arms	3.36	1.93	4.45	1.32	2.38	1.75	moral
The explosive power of the two men	2.10	0.54	2.90	1.02	3.29		moral
The strength characteristic of the speed of the arms	20.35	1.97	30.33	2.12	4.99		moral
The aiming accuracy of the jump	6.86	2.75	8.65	2.55	3.10		moral

Below the level of significance (0.05) (n-1) = 15

4. Discuss the Results

Through what was presented in Table (2), which shows the arithmetic mean, standard deviations, and the test (T.test) for the research sample individuals for the level of performance of some physical characteristics and the accuracy of shooting

in handball in the pre and post tests, and the results showed significant differences for players in the post tests, and the researchers attribute The use of special exercises and reliance on the method of interval training led to this development in the research variables, which confirms the effective effect of

the various physical exercises for the development of the explosive strength of the muscles of the two legs that have been adopted jumping forward exercises in addition to jumping exercises to the terraces or landing (plyometric exercises) according to Some biomechanical indicators for the development of explosive power for the muscles of the two legs, and this agrees with the opinions of many sports training experts who see the use of plyometric exercises as an important training method for the development of explosive power. (5:121) (2:116)

This also agrees with what was indicated by (Abu Al-Ela Ahmed and Muhammad Hassan Allawi) that (the period of muscular contraction is inversely proportional to strength, so the shorter the muscle contraction period, the greater the strength) (1:124). Mufti Ibrahim believes that the shorter the duration of muscle contraction, the greater the muscle strength and the higher the rate of contraction. (17:138)

The researchers attribute the reason for this development to the exercises applied by the sample, which proved effective in developing the explosive strength of the muscles of the arms through the results obtained, as (medicine balls of different weights) were used with a motor path similar to the motor path of the skill, in addition to all the exercises that were performed According to the correct mechanical foundations through the gradual performance of the movements from stability and movement, and then jumping with one arm and with both arms together, taking into account the gradation in the difficulty of the exercises as well as some biomechanical indicators to serve the motor activity and its goal and by using the muscle groups involved in the throwing process, which led to Increasing the ability of muscles to contract at a faster rate when performing successive movements mixed with strength and speed in motor performance.

The researchers also took into account the gradation in the difficulty of the exercises in order to serve the motor activity and its goal, and this was confirmed by (Abdul Aziz Al-Nimr and Farhan Al-Khatib) that the most important advantages of the explosive power is that it increases the motor performance, meaning that the power gained from this type of training leads to activity Better movement in the practiced sports activity by increasing the ability of the muscles to contract at a faster and more explosive rate during the range of motion in the joint and at all speeds of movement. (9:114) Thus, it can be said that the exercises that were used in the training curriculum contributed to developing the explosive strength of the arms

It also confirms the effective effect of the physical exercises used in the training curriculum for the development of muscle groups that contribute to the development of the speed-distinguishing strength of the muscles of the arms using a variety of exercises, which focuses on performing repetitions characterized by fast and strong muscle contractions in order to increase the elasticity of the muscles and obtain the largest possible kinetic energy Through strong and rapid pushing against an external resistance, and this improvement is also due to the training method and various exercises within the vocabulary of the training curriculum, and this is consistent with what (Mufti Ibrahim) mentioned (The training methods and methods used in developing the strength distinguished by speed are the method of high-intensity interval training). (17:144) And the power that is distinguished by speed is related to the skillful performance, so the higher the degree of skillful performance, the higher the level of compatibility between fibers and muscles, and the better the level of dynamic distribution of motor performance). (3:133)

The researchers believe that this development in the characteristic of strength distinguished by speed results from the development in the characteristic of strength, and this comes in line with what (Qasim Hassan Hussein) confirmed that "one of the basic methods in developing strength distinguished by speed is through the development of strength." (12:84) "And the coordination within and between the muscles helps in increasing the speed of movement (power). (7:526)

There is also a difference between the results of the pre and post tests, in favor of the post test in the high jump shooting accuracy test. The results showed that the calculated (T) value is greater than the tabular (T) value at a degree of freedom (15), and below the level of significance (0.05), and this indicates that a highly significant development has occurred in the skill of aiming accuracy from jumping, which It confirms the positive and effective effect of the training curriculum from various and varied special exercises, as well as precision exercises in different forms that permeated the units of the training curriculum, which led to the development of rapid and explosive strength of the muscles of the arms and legs, by increasing the number of repetitions and performing exercises with a motor path similar to the motor path of skill, which It develops the physical and skillful side at the same time. The exercises that were used in the training curriculum, which were applied to the research sample, tend to develop all variables related to the performance of the skill by organizing the work of the muscle groups towards the motor duty.

"In addition, the concentrated training of muscular strength and explosive power of the arms and legs leads to the development of the level and accuracy of shooting in handball." (19:168)(14:155)

5. Conclusions and recommendations

5.1 Conclusions

By presenting, analyzing and discussing the results of the pre and post tests of the research sample, the researchers were able to reach the following conclusions:

- 1- The use of the two special exercises contributed to the development of some physical abilities and shooting accuracy from jumping high for young handball players.
- 2- The results showed, through post-tests, an improvement in the level of performance of the research sample in some physical abilities and shooting accuracy from jumping high for young handball players in favor of the post-test.
- 3- The organization of the performance and application of special exercises according to some biomechanical indicators and the curriculum prepared by the researchers among the research sample members contributed to raising the level of performance of some physical abilities and shooting accuracy from jumping high with handball, and this appeared through the post-results.

5.2 Recommendations

From the conclusions reached, we can come up with the following recommendations:

- 1- The importance of using the exercises prepared by the researchers, as they are effective for the ages of this stage, because they led to the development of the research variables.
- 2- The need to pay attention to the skill of aiming by jumping high, as it is one of the most important and difficult offensive skills, in addition to that it creates more compatibility for the player by increasing the accuracy during aiming.

- 3- Conducting comparative studies in the use of exercises on sports events to find out the effect of these exercises among sports.
- 4- Conducting studies on different samples of both sexes in the handball game.

6. References

1. El-Ela A, Abdel-Fattah A, Allawi MH. Physiology of Sports Training, (Cairo, Dar Al-Fikr Al-Arabi; c1994.
2. El-Ela A, Abdel-Fattah A, El-Din AN. Physiology of Physical Fitness, 1st edition, (Egypt, Dar Al-Fikr Al-Arabi; c1993.
3. Al-Ela A, Abdel-Fattah A. Sports Training: Physiological Foundations, 1st Edition (Al-Nasr City, Dar Al-Fikr Al-Arabi; c1997.
4. Oraibi A. Handball and its basic elements, 1st edition, Baghdad; c2005.
5. Ahmed B. Fundamentals and theories of sports training. Cairo: Dar Al-Fikr Al-Arabi; c1999.
6. Jaber JAH, Kazem AK. Research Methods in Education and Psychology, (Cairo, Dar Al-Nahda Al-Arabiya for printing, publishing and distribution; c1989.
7. Khraibet R. Applications of Physiology and Sports Training, 1st Edition, (Amman, Dar Al-Shorouk for Publishing and Distribution; c1997.
8. Al-Khayyat D, Al-Hayali A. Handball, (Mosul, Dar Al-Kutub for Printing and Publishing; c2001.
9. Al-Nimr AA, Al-Khatib F. Weight Training: Designing the Strength Program and Planning the Training Season, (Cairo, Al-Kitab Center for Publishing; c1996.
10. Al-Mandalawi Q. Testing, measurement and evaluation in physical education, (Mosul, Higher Education Press; c1990.
11. Hussein QH, Ahmed B. Isometric muscle training in the field of sporting events Baghdad; c1979.
12. Hussein QH. The Science of Sports Training at Different Ages, 1st edition, (Amman, Dar Al-Fikr Al-Arabi; c1998.
13. Darwish K. (And others): Measurement, Evaluation and Match Analysis in Handball - Theories - Applications (Cairo, Book Center for Publishing; c2002.
14. Hamada MJMM. The Effect of Developing Muscular Strength on the Skill of Shooting by High Jump in Handball, PhD thesis, Faculty of Physical Education for Boys, Helwan University; c1987.
15. Allawi MH, al-Din Radwan MN. Skillful and psychological tests in the sports field, 1st edition: Dar Al-Fikr Al-Arabi, Cairo; c1987.
16. Allawi MH. The Science of Sports Training: (Cairo, Dar Al-Fikr Al-Arabi, 6th edition; c1999.
17. Mufti Ibrahim, Modern Sports Training: Planning, Implementation, Leadership, 1st Edition, (Amman, Dar Al-Fikr Al-Arabi for Printing and Publishing; c1998.
18. Jassim WM. scientific research methods and methodology; Baghdad, House of Wisdom for Printing; c1993.
19. Al-Zuhairi WK. The use of some suggested training methods to train performance capabilities for the stage of getting up according to some biomechanical indicators for aiming from jumping high, research published in (Contemporary Sports Journal, College of Physical Education for Girls, Issue 12 of 2010).
20. Schiffer Jurgenen: Selected and Annotated Bibliography New Studies in Athlaties Vollo, No.3; c1995.