Journal of Humanities and Social Sciences Researches (JHSSR)

ISSN: 2958-3160 (Online)

# The Impact of Skill Training Exercises Utilizing a Device Designed for Enhancing Precision in Offensive Basketball Skills Among Players Under 18 Years of Age

**Assistant Professor Dr. Auday Mahmoud Zahmer[1], Mohammed Ahmed Najm Abdullah[1], Mustafa Khurshid Ahmed[1]**

[1] College of Physical Education and Sports Sciences, Tikrit University, Iraq.

* Corresponding author: m.bayitay@tu.edu.iq

Received: 10/01/2024 Accepted:20/03/2024

## Abstract

This study aimed to design a customized training apparatus focused on refining the precision of offensive basketball skills, targeting players aged eighteen and under. Skill exercises were meticulously developed to harness the potential of this device, resulting in a significant improvement in skill precision within the experimental group compared to their counterparts in the control group. The findings underscore the pivotal role of innovative training tools in advancing skill development, while also fostering enthusiasm, perseverance, and excitement among young basketball players. Such interventions not only enhance performance but also contribute to the holistic development of aspiring athletes, instilling essential qualities that extend beyond the realm of sports. Through this research, valuable insights were gained into the efficacy of targeted training methodologies, paving the way for further advancements in athletic training and skill enhancement strategies.

**Keywords:** Exercises, Device, Precision of Performance, Offensive Skills, Basketball

## Introduction

1- Research definition:

1-1 Research Introduction and Significance:

The world is currently witnessing a significant and rapid advancement in all aspects of life, including the field of sports at all levels (administrative, organizational, and coaching). There have been substantial strides in the utilization of the sciences related to sports and the integration of innovative technologies, tools, and devices to develop and enhance the abilities and skills of athletes, as well as the performance levels of their teams. These efforts aim to support modern coaching principles, which in turn have a positive impact on the results of sports clubs across all their disciplines.

One such sport benefiting from these advancements is the game of basketball, which has risen to a prominent position and enjoys a large following in many countries. This status has been achieved due to its captivating blend of refined artistic performance characterized by swift and rhythmical movements



DOI: 10.33687/jhssr.003.02.000316

that inspire admiration and enjoyment among spectators, especially when diverse scoring techniques are executed. The fundamental skills required in basketball demand a high degree of precision to effectively implement strategies, particularly on the offensive end, all while avoiding fouls and errors[1].

The offensive skills in basketball, including reception, dribbling, passing, shooting, and offensive positioning, are interconnected and complementary. They form a unified set of skills, and the weakness in one can affect the others. During competition, they are performed as a seamless sequence, comprising several fundamental offensive skills. Consequently, these skills require continuous and organized training involving physical and skill-based exercises, utilizing various methods, techniques, and specially designed training equipment to enhance them and keep up with the rapid developments in sports coaching.

Many institutions and enthusiasts in this field have directed their efforts towards inventing scientific training tools and devices that align with both physical and skill-based exercises. These tools aim to elevate athletes' capabilities, improve their team's performance, and enhance their competitive advantage. Offensive skills in basketball are the foundation of individual competition and the cornerstone for players' success in executing offensive strategies correctly, allowing them to overcome rapidly changing and escalating game situations with the required speed and precision to score points efficiently against the opposing team's basket, achieving victory. This necessitates the provision of comprehensive training resources by sports clubs' administrations and those in charge of training centers and specialized basketball schools. These resources are crucial for overall physical development and precise skill performance, elevating the level of basketball players and teams.

The foundation for elevating athletic performance in sports, including basketball, lies in comprehensive physical and skill-based preparation. This preparation focuses on the use of physical and skill-based exercises, along with scientific training methods and equipment tailored to the specific element, whether it is physical or skill-related. It is essential for the coach to be precise in designing the appropriate drills and methodologies aligned with the type of sport intended for improvement[2].

Considering the above, the significance of this research is underscored by the development of skill exercises using a training device designed by the researchers. This device aims to enhance the precision of performance in some offensive basketball skills and to experiment with its role in advancing the training process and its impact on improving the precision of performance in these offensive skills among basketball players under the age of eighteen.

Utilizing these exercises through the designed device facilitates the mastery of motor performance with a high degree of precision in executing these skills, enabling their effective incorporation into strategic plays. Moreover, the designed device concurrently enhances three offensive basketball skills, thereby reducing costs, effort, and time in training. Instead of manufacturing three separate devices for each skill, a single device is created to improve three offensive skills simultaneously. This contributes to streamlining the training process, reducing the trainer's workload,

[1] Ahmed Amin Fawzi, *Basketball: History, Principles, and Fundamental Skills*, 1st ed. (Alexandria: Al-Alam Al-Riyadi Publishing House and Dar Al-Wafa for Printing, 2014), 76.

[2] Hend Mohammed Amin; "The Impact of Some Preferred Learning Methods According to Sensory Modeling Using Assistive Tools in Developing Some Motor Skills and Learning Peaceful Shooting in Basketball for Students" (Unpublished Ph.D. Thesis, University of Babylon / College of Physical Education and Sports Science, 2017), pp. 41-42.



DOI: 10.33687/jhssr.003.02.000316

optimizing time utilization, and enhancing the players' precision in executing the skills under investigation.

1-2 Research Problem:

Based on the researchers' experience in the field of basketball, including their participation as players in the education teams in Salah al-Din province, the University of Tikrit team, and their involvement with various sports clubs, as well as their observation of the local league for under-18 basketball teams, they have noticed a deficiency in the precision of performance in some offensive skills. Foremost among these skills are ball reception and chest passing, which are affected by incorrect ball reception techniques, an increase in unsuccessful and erroneous chest passes, a low success rate in shooting from two-point and three-point positions, and improper execution of these skills, especially among basketball players under the age of eighteen.

Furthermore, they have observed a limited use of training devices and assistive tools by some coaches. Without these tools, no team can keep up with the rapid developments occurring in the world of basketball, which negatively impacts their performance in competitions. However, by incorporating skill exercises using training devices into their training routines, teams can save time and effort, leading to improved performance and the desired achievements.

Therefore, the researchers have undertaken the design of a training device and the development of skill exercises to be used in conjunction with the designed device. The primary aim is to enhance the precision of performance in some offensive basketball skills. This is achieved through a systematic and scientific training approach that emphasizes not only skill execution but also the accuracy of its performance. These exercises are conducted using the designed device, ensuring a comprehensive and effective training regimen.

1-3 Research Objectives:

The research objectives can be summarized as follows:

1. Designing a training device to enhance the precision of performance in some offensive basketball skills.

2. Developing skill exercises using the designed device to improve the precision of performance in some offensive basketball skills for players under the age of eighteen.

3. Investigating the impact of skill exercises using the designed device on the improvement of the precision of performance in some offensive basketball skills for players under the age of eighteen.

4. Assessing the significance of the differences in the pre-test and post-test results between the control and experimental groups regarding the development of precision in some offensive basketball skills for players under the age of eighteen.

5. Identifying differences in the post-test results between the control and experimental groups regarding the improvement of precision in some offensive basketball skills for players under the age of eighteen.

1-4 Research Hypotheses:

The research hypotheses are as follows:

1. There are statistically significant differences in the pre-test and post-test results between the control and experimental groups of basketball players under the age of eighteen.

2. There are statistically significant differences in the post-test results between the control and experimental groups of basketball players under the age of eighteen.

1-5 Research Scope:

1-5-1 Human Field: Basketball players from the Tuz Sports Club under the age of eighteen for the sports season 2022/2023.

1-5-2 Temporal Field: January 2, 2023, to April 1, 2023.

1-5-3 Spatial Field: Tuz Khurmatu Olympic Indoor Hall.

3- Research Methodology and Field Procedures:

3-1 Research Method:

The researchers employed an experimental method using a comparative approach to suit the nature of the research. As described by Alaa and Mazen (2011), this method relies on experimentation and field testing guided by observation and the use of modern scientific tools, devices, and methods to highlight any causal relationship between one or more variables within a controlled framework and the organization of evidence and proof[3]

The researchers utilized the experimental design with two groups, the control group, and the experimental group, known as the pre-test and post-test with equivalent groups design (1), as illustrated in the following section.

(There is a group design that is not clear here ….

"Figure (1) illustrates the experimental design of the research."

3-2 Research Population and Sample

The research population consists of basketball players under the age of eighteen from various clubs in Salah al-Din Province, totaling fifty-two players representing four clubs, as shown in Table (1). The research sample was purposefully selected and consisted of players from the (Tuz Sporting Club), totaling fourteen players, representing 26.92% of the total research population. Two players were excluded from the sample as they had participated in the pilot experiment, representing 3.84% of the total research population. The final research sample consisted of twelve players, representing 23.07% of the total research population. They were randomly divided into two groups, the control group, and the experimental group, with each group consisting of six players.

[3] Ali Saloum Jawad and Mazen Hassan Jasim; Scientific Research, Fundamentals and Methodologies, Hypothesis Testing, Experimental Design: (Iraq, Najaf, Dar Al-Diaa for Printing and Design, 2011) p. 140.



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Table 1 The research community and its sample

| s | Research Community | Number of players | Percentage % |
|---|---|---|---|
| 1 | Tuz Sports Club | 14 | % .26.92 |
| 2 | Samarra Sports Club | 14 | %.26.92 |
| 3 | Dujail Sports Club | 12 | %23.07 |
| 4 | Aq Su Sports Club | 12 | %23.07 |
| **Total** | | 52 | %100 |

3-3 Sample Homogeneity

Sample homogeneity was conducted to control the variables that influence the test results, including height, weight, chronological age, and training age. These variables were statistically processed using the homogeneity coefficient law. The results revealed that the coefficient of variation for these variables ranged between (±1). Therefore, the sample is normally distributed. As mentioned by Wadia (1999), "the more the coefficient of variation falls within the range of (±1), the more homogeneous the sample is[4]" (see Table 2).'

Table 2 Sample Homogeneity

| S | Variables | Arithmetic mean | Standard deviation | Mean | Torsion coefficient |
|---|---|---|---|---|---|
| 1 | Length (cm) | 175.6 | 2.95 | 173 | 0.085 |
| 2 | Mass (kg) | 66.4 | 2.36 | 65 | 0.076 |
| 3 | Age (years) | 17.24 | 0.68 | 17.3 | 0.633 |
| 4 | Training Age (years) | 5.14 | 0.68 | 4.78 | 0.432 |

3-4 Sample Equivalence

Equivalence was found between the experimental and control groups in the pre-test of the accuracy of performing some offensive basketball skills (receiving the ball, chest pass, shooting from two points, and shooting from three points) at a significance level of 0.50. Table (2) illustrates the absence of statistically significant differences between the research groups in the tests of the accuracy of performing offensive basketball skills, as the value of (sig) was greater than 0.05, indicating the equivalence of the research groups in the mentioned variables. Table (3) shows this:

Table (3) Research Sample Equivalence

[4] Wadia Yasin Al-Tikriti and Mohammad Hassan Al-Obaidi; Statistical Applications and Computer Uses in Physical Education, 2nd edition: (Mosul, Dar Al-Kutub for Printing, 1999), p. 178.

| S | Statistical milestones / Skill tests | genre | Arithmetic mean | Standard deviation | t value Calculated | Sig | Significance |
|---|---|---|---|---|---|---|---|
| 1 | Receiving the ball | control | 3.833 | 0.752 | -3.873 | 0.061 | unsignificant |
| | | Experimental | 4.333 | 1.032 | | | |
| 2 | Chest pass | control | 18.166 | 1.834 | -1.085 | 0.388 | unsignificant |
| | | Experimental | 17.333 | 0.816 | | | |
| 3 | Jump Shot | control | 7.833 | 1.329 | -2.000 | 0.122 | unsignificant |
| | | Experimental | 8.500 | 2.073 | | | |
| 4 | Three-point jump Shot | control | 9.500 | 2.345 | -1.754 | 0.146 | unsignificant |
| | | Experimental | 9.666 | 1.366 | | | |

**Statistically significant if the significance level is < (0.05).**

3-5 Data Collection Methods and Research Tools:

3-5-1 Data Collection Methods:

- Arabic and foreign sources and references.
- Personal interviews with relevant individuals.
- Special forms for recording and transcribing the results of research-specific tests.

3-5-2 Tools Used:

- Sensitive scale.
- Measuring tape.
- Camera holders (2).
- Chalk.
- Basketball balls (6).
- Whistles (2).
- Pointers (2).
- Colored adhesive tapes.
- Basketball court.

3-5-3 Devices Used:



DOI: 10.33687/jhssr.003.02.000316

- Nokia cameras (2).

- HP computer.

- The device designed by the researchers.

3-6 Research Variables and Tests:

3-6-1 Design of a device for improving the accuracy of performance in some offensive basketball skills.

The researchers designed a device with specific measurements to improve the skill of ball reception, the accuracy of chest passing, shooting from two points, and shooting from three points. The process of making the device included several stages:

1. Preliminary Planning Stage: The researchers utilized the expertise of their supervisor and consulted with specialists in sports training and mechanical engineering through personal interviews[5].

2. CAD Drawing Stage: Detailed measurements and drawings of the device parts were created using AutoCAD to ensure precise design.

3. Fabrication Planning Stage: The device's components were cut and prepared according to the design.

4. Ball Shooter Design Stage: The mechanism for shooting balls was designed.

5. Metal Parts Assembly Stage: The metal parts of the device were assembled.

6. Electrical and Mechanical Components: The iron structure of the device was equipped with the necessary electrical and mechanical components.

7. Testing Stage: The device's functionality was tested through multiple attempts to ensure the correct operation of the ball shooter and the device.

8. Packaging Stage: The device was packaged and equipped with colored lighting.

The researchers relied on local markets to provide the tools and components needed for the device and its mechanisms, taking into consideration the suitability of the device for indoor court surfaces in terms of weight. The measurements and components of the device are as follows:

- The device consists of an iron box with a thickness of one and a quarter inch, rectangular in shape, enclosed in colorful plastic for protection and safety of the players, with dimensions of 75 cm in width, 110 cm in length, and 120 cm in height. The device is surrounded by white strip lighting with a capacity of twelve volts. The device also has four plastic frames that can be locked and opened, raising the base of the device 10 cm above the ground, making the height of the first part of the device (the rectangular base) 130 cm above the ground.

[5] - An interview was conducted with experts on December 18, 2022, at the College of Physical Education and Sports Sciences, Tikrit University, in the sports hall.
- An interview was conducted with experts on December 20, 2022, at the College of Physical Education and Sports Sciences, Diyala University, in the college library.
- An interview was conducted with experts on December 21, 2022, at the College of Tuz Khurmatu, Tikrit University, in the college library.

The lower base of the device is divided into two parts from the front: the lower part has dimensions of 42 cm in length and 75 cm in width, while the upper part is inclined backward with dimensions of 88 cm in length and 75 cm in width. In the middle of this upper part, there is a circular opening with a diameter of 45 cm, through which balls are thrown to the players at different distances ranging from two meters to four meters. The distance is controlled according to the coach's preferences and training requirements.

Attached to the bottom base of the device from above is another iron box with a thickness of one and a quarter inch, resting on a square base with dimensions of 70 cm in length and 75 cm in width. It has a front interface with dimensions of 55 cm in width and 71 cm in length. In the middle of this front interface, there is a circular opening with a diameter of 45 cm for receiving chest passes from the player receiving the ball from the lower circular opening of the device. Connected to the upper part of the device are two movable arms, one on the right and one on the left, surrounded by blue lights that move up and down. Each arm is 64 cm long, with 5 cm concealed from each arm to secure them to the upper part of the device, allowing them to move, leaving 59 cm visible from the two arms. This makes the total height of the upper part of the device with the arms 130 cm.

Behind the front interface of the upper part of the device, there is a curved shape approximately 60 cm in length, fixed to the upper part of the device's base. It is used as a ramp for the ball to descend into a basket for collecting the balls inside the device for re-throwing to the players, enclosed in colored plastic for protection.

Lighting strips in white color surround the arms, the first circular opening for chest passes, the second circular opening for throwing balls to the players, and the outer edges of the device from the front.

Inside the device, there is a spiral ball launcher that throws the balls to the players at different distances ranging from two meters to four meters from the ball basket inside it. The capacity of the ball basket is six balls.

- The device contains a voltage regulator to control the electrical current.

- The device includes a shaft to change the direction of the ball's ascent and descent.

- The device includes a lever for controlling the distance the balls are thrown.

- The device includes a DC electric motor that controls the up and down movement of the pointer arms.

- The device includes an electric motor (AC 220, quantity 1) with a capacity of 1500 RPM.

- The device also includes a double iron spring compressor on the ball launcher, along with washers (quantity 2).

- The device also has two gearbox boxes to adjust the power of the ball throw.

- The device includes an electrical circuit breaker (plug) to disconnect the electrical current from the upper part of the device, as well as an electrical circuit breaker (plug) to disconnect the electrical current from the entire device.



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The operation of the device is controlled by a control unit, and it operates in several modes as follows:

1. The device operates through an electrical cable connected between the device and a power source with electricity to activate:

- The player-shaped device (the pointer) with two arms.

- The ball launcher from the lower circular opening of the device.

- The multicolored lighting of the device.

2. The lighting of the device can be controlled through buttons located behind the device.

3. The upper opening in the device allows the ball to enter through a chest pass, which sends it down to the ball basket located below the opening for ball collection.

4. The lower opening in the device releases the ball after it is thrown by the ball launcher inside the device.

5. This device operates using a 12-volt battery connected to a protective device to ensure the safety of the operators and players from electrical current.

6. The control of raising the arms of the pointer, which is used as a defender, is done through buttons located behind the device. This movement is controlled by connecting it to electrical wires with a 12-volt DC electric motor.

7. The device throws the balls at different distances for the player to receive, according to the coach's preferences and training requirements, by using the lever for controlling the throwing distance.

3-6-1-1 The designed device has several features:

1. The device is designed to enhance the precision of more than one offensive skill, including chest passing, receiving, and shooting accuracy from two and three-point positions in basketball. These are fundamental offensive skills that significantly impact the results of basketball games.

2. The device's design resembles that of a defending player, with moving arms that mimic the up-and-down movement of a defending player, preventing shooting towards the basket.

3. In the lower part of the device, there is a ball launcher that can propel the ball to various distances through a circular opening based on training requirements and the coach's preferences.

4. In the upper part of the device, there is a circular opening for receiving the ball through a chest pass from the trainee player. The received balls are collected in a basket inside the device and then launched back to the player.

5. The device can launch balls at various speeds, making it easier for players to practice skills accurately and correctly, reducing the effort required from both players and the coach in skill training.

6. The device has the capability to control the speed and quantity of ball launches.

7. It is manufactured using simple, readily available, and cost-effective materials, making it easy for any club or specialized center to manufacture and utilize it for the training and development of individual player skills.

8. Coaches can monitor player performance and correct performance errors without being occupied by the movement of a defending player, as the device itself can serve as a defender.

9. It leads to an increase in players' self-confidence, resulting in greater effort during games, which positively impacts the team's results through the development of teamwork.

10. The most important feature of this device is its ability to enhance players' abilities by improving offensive skills, including chest passing accuracy, precise ball reception, and accurate shooting from two and three-point ranges. It also enhances players' concentration during skill execution. These advantages are achieved due to the precision with which the device delivers the ball to the trainee player, its ability to launch many balls per minute, the device's lighting, the movement of the arms on top of the device, and the precise execution of skills. These factors contribute to the success of players in performing these skills, integrating them with other offensive and defensive skills, and incorporating them into the team's game plans to increase the team's chances of winning matches.

After designing the device, it was confirmed that it functions correctly and serves the purpose for which it was designed. It was then submitted to the Ministry of Planning, the Central Organization for Standardization and Quality Control, Intellectual Property Department, to obtain a patent.

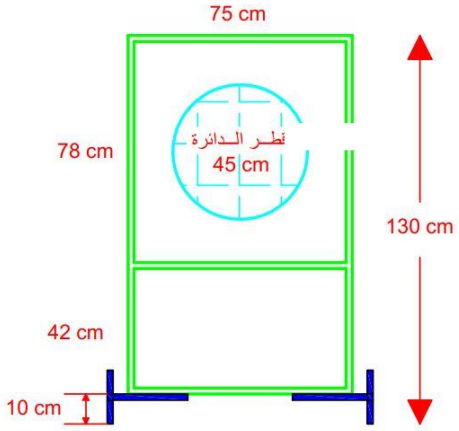


Figure (2) illustrates the measurements of the lower section of the device (front section)



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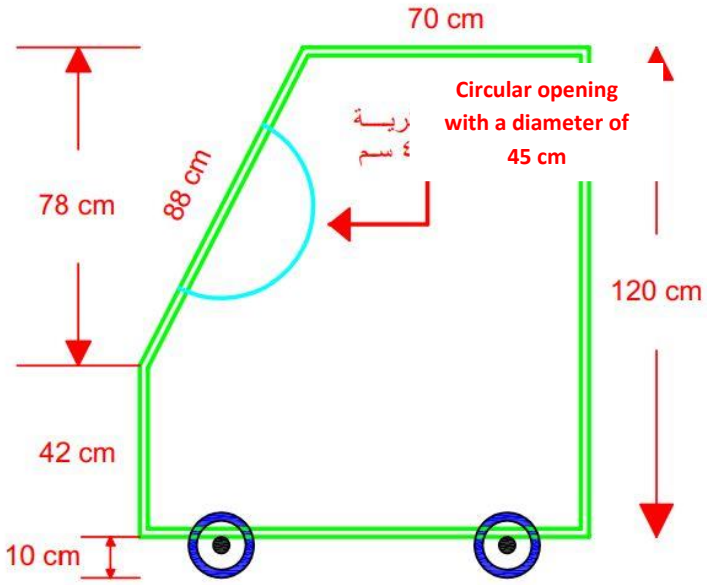


Figure (2) illustrates the measurements of the lower section of the device (side view)

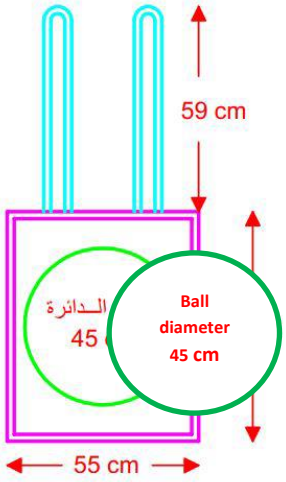


Figure (3) illustrates the measurements of the upper section of the device (front view)

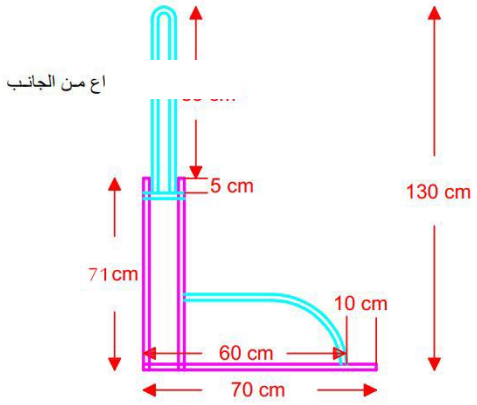


Figure (4) illustrates the measurements of the upper section of the device (side view)

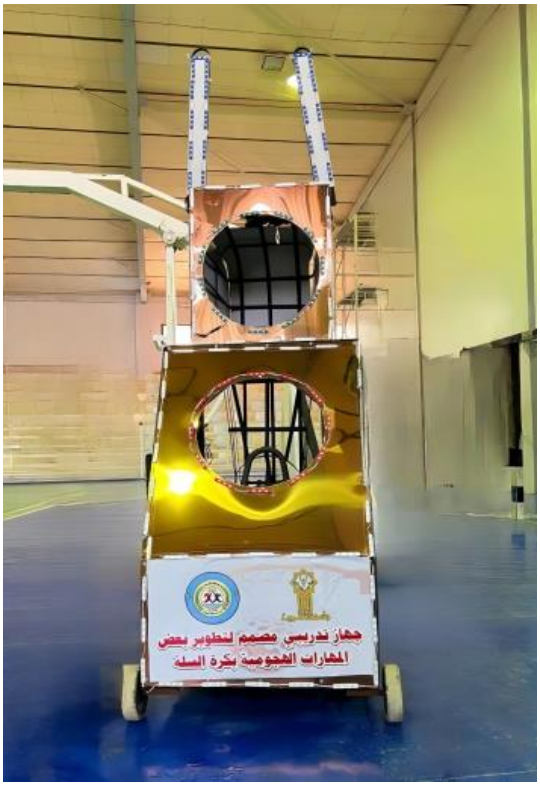


Figure (5) The final design of the device

3-7 Field Research Procedures

The research procedures involved preliminary tests and the application of skill exercises using the designed device on the experimental research group, followed by subsequent tests.

3-7-1 Determining Basketball Offensive Skills

The researchers selected several offensive skills specific to basketball that are compatible with the designed device, including:

1- Ball reception.

2- Chest pass.

3- Shooting with a two-point jump shot.

4- Shooting with a three-point jump shot.

3-7-2 Skill Tests Used in the Research

The researchers reviewed previous sources and studies to identify the most important tests. Most studies and sources agreed on the following tests.



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3-7-2-1 Ball Reception Test6


Figure (6) illustrates the ball reception test.

3-7-2-2 Chest Passing Accuracy Test7

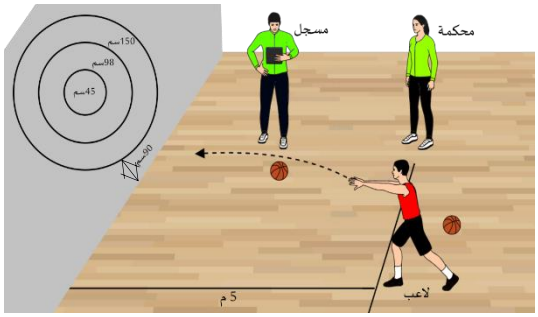
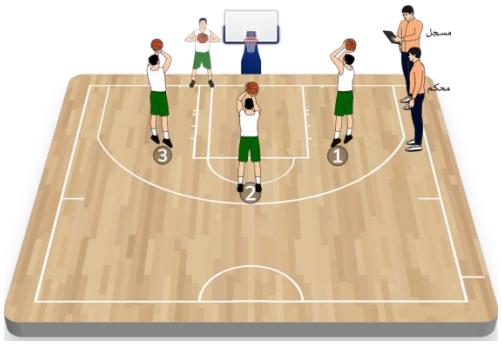



Figure (7) illustrates the Chest Passing Accuracy Test.

3-7-2-3 Two-Point Jump Shooting Accuracy Test from Three Directions8




[6] Islam Saber Hashem: a program to develop some visual abilities and its effect on the level of offensive skills performance in basketball for second-grade students: (Unpublished master's thesis, Asyut University / Faculty of Physical Education, 2015)

[7] Ali Salum Jawad; Tests, Measurement, and Statistics in the Sports Field: (Baghdad, Al-Tayf Printing House, 2004) p. 176.

[8] Yasar Sabah Jasim; Basketball Fundamentals, 2nd edition: (Iraq, Diyala, Central Printing House, 2006) pp. 285-286.

Figure (8) illustrates the Free Throw Jump Shooting Accuracy Test.

3-7-2-4 Three-Point Jump Shooting Accuracy Test from Three Directions9


Figure (17) illustrates the Three-Point Jump Shooting Accuracy Test from Three Directions.

3-8 Field Research Procedures

3-8-1 First Exploratory Experiment

The researchers, along with the assistant team and the specialized engineer responsible for designing and manufacturing the device, conducted the first exploratory experiment on (2) of the players who were excluded during the implementation of the basic research procedures. The experiment was conducted on Thursday, January 5, 2023, and during it, the following was accomplished:

- Assessing the device's suitability.

- Determining the time consumed when performing exercises.

- Identifying obstacles and difficulties accompanying the main experiment.

- Ensuring the compatibility of skill exercises with the device.

- Identifying the intensity, size, and comfort between repetitions and sets.

3-8-2 Second Exploratory Experiment

The researchers, along with the assistant team, conducted the second exploratory experiment on Saturday, January 7, 2023, with the following objectives:

- Identifying the obstacles accompanying the main experiment.

- Determining the time required to administer the tests.

- Training the assistant team on how to record test scores.

- Selecting suitable locations for installing the cameras.

[9] Yasar Sabah Jasim; Source previously mentioned, p. 311.



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3-8-3 Pre-Tests

The pre-tests were conducted on Tuesday, January 10, 2023, to determine the level of performance accuracy of some offensive skills for the research sample. The tests were conducted in the (Tuz Khurmatu Olympic Indoor Hall).

3-8-4 Principles of Exercise Development

The researchers prepared skill exercises for use with the designed device within training units, as outlined in Appendices (1) and (2), to enhance the accuracy of performing some offensive basketball skills. The execution of the exercises began on Thursday, January 12, 2023, and continued until Monday, March 6, 2023, lasting for 8 weeks. They were conducted at a rate of three training units per week, totaling (24) training units.

Notes on the Exercises Used

- The exercises were implemented in the special preparation phase.

- Exercise sessions were held on Mondays, Thursdays, and Saturdays.

- The exercises were used in the main part of the training unit with the designed device.

- The high-intensity interval training (HIIT) method was employed.

- Intensity ranged from 80% to 90%.

- The duration of exercise performance in the main part of the training unit ranged from 30.5 to 42.63 minutes.

- Intensity, comfort, and size changes were detailed in Appendices (1) and (2).

3-8-5 Post-Tests

The post-tests were conducted on Thursday, March 9, 2023, after completing the exercises, following the same method as the pre-tests for the experiment.

3-9 Statistical Methods

The researchers used the Statistical Package for the Social Sciences (SPSS) to process the raw data obtained. They utilized various statistical measures, including the mean, standard deviation, skewness, and t-tests for related and unrelated samples.

4- Presentation and Discussion of Results

4-1 Presentation and Discussion of the Skill Test Results for the Control Group

Table (4) Indicates the Significance Results for the Pre- and Post-Skill Tests for the Control Group

| **auditions** | **Unit of measurement** | **pre** | | post | | **t value Calculated** | Sig | significance |
|---|---|---|---|---|---|---|---|---|
| | | M | SD | M | SD | | | |
| **reception** | degree | 3.8333 | 0.752 | 4.833 | 0.983 | -3.873 | 0.012 | significant |
| **Chest pass** | degree | 18.166 | 1.834 | 18.833 | 1.9407 | -1.085 | 0.328 | unsignificant |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **shot from jumping - two points** | degree | 7.833 | 1.329 | 8.500 | 1.516 | -2.000 | 0.102 | unsignificant |
| **shot from a three-point jump** | degree | 9.500 | 2.345 | 10.833 | 1.940 | -1.754 | 0.140 | unsignificant |

**Statistically significant at a level less than or equal to (0.05).**

According to Table (4), it becomes evident that there are no statistically significant differences in the skill variables except for ball reception skill. Despite the slight improvement in the skill level of the researched skills in the control group, the differences in the mean values do not reach statistical significance in both pre- and post-tests, except for ball reception skill, which showed statistically significant results.

Researchers attribute this to the fact that the exercises used in the training units were not effectively impactful in developing the skill level of the researched skills for the control group. This is due to the coach's reliance on traditional training methods and the absence of training units that incorporate the use of innovative training devices and methods. This led to the lack of significant improvement in the control group, except for ball reception skill. This may be because ball handling is continuously practiced and repeated in the game and training, leading to improvement in this specific skill.

It is known that modern training relies on the use of devices and aids in any sport, especially in basketball, where all training capabilities and coaching resources need to be fully employed to create an optimal training environment. This helps prepare the player well and optimally by creating a training atmosphere that aids in enhancing their physical and skill performance to reach the level desired by the coach.

this is what Mahmoud (2008) confirmed when he stated, 'The training process requires the availability of the necessary resources, including devices and auxiliary tools, to implement the training curriculum. These auxiliary tools are the means through which the coach can enhance players' technical, tactical, physical, and cognitive levels. Furthermore, these auxiliary tools represent a modern trend in the fields of education and training, a trend that is growing to encompass various sports to achieve the highest levels of performance10.

4-2 Presentation and Discussion of the Skill Test Results for the Experimental Group

Table (5) Presents the Significance Level Results for the Pre- and Post-Skill Tests for the Experimental Group.

[10] Mahmoud Dawood Al-Rubaie; Cooperative Learning Strategies, 1st edition: (Najaf, Dar Al-Diaa for Printing and Design, 2008) p. 266.



DOI: 10.33687/jhssr.003.02.000316

| auditions | Unit of measurement | pre | | post | | Calculated T- value | Sig | Significance |
|---|---|---|---|---|---|---|---|---|
| | | M | SD | M | SD | | | |
| reception | degree | 4.333 | 1.032 | 7.000 | 0.894 | -8.000 | 0.000 | significant |
| Chest pass | degree | 17.333 | 0.816 | 23.166 | 1.834 | -7.362 | 0.001 | significant |
| Two-Point Jump Shooting | degree | 8.500 | 2.073 | 12.833 | 2.136 | -5.139 | 0.004 | significant |
| Three-Point Jump Shooting | degree | 9.666 | 1.366 | 13.000 | 2.529 | -3.071 | 0.028 | significant |

At a significant level of less than or equal to 0.05.

Based on Table 5, it is evident that there are significant differences between the pre-test and post-test scores in the research-based skills among the experimental group. Researchers attribute this improvement to the effectiveness of the device designed for skill development and the effectiveness of the exercises used in the training modules. The experimental group performed exercises including chest passes on the device, receiving the ball from the device, and shooting exercises with two and three-point shots. Target shooting was varied in terms of positions and angles during the training modules used by the experimental group, all with appropriate repetitions. Thus, the research was successful in enhancing the skills it addressed. This is supported by Essam (two thousand), who stated that increasing the repetition and training on a skill through regular training units leads to mastery of that skill11.

The researchers also attribute the reason for the development of research-based skills to the effectiveness of the designed device in achieving performance stability towards a specific goal set by the player. The player can focus on passing the ball into the circular opening in the upper section of the device using chest passes after receiving the ball from the circular opening in the lower section of the device at varying distances. This forces the player to concentrate on the accuracy of passing and receiving. Additionally, the movement of the device's articulated arms has helped in improving the skill of shooting from a jumping position by compelling the player to jump higher to clear the device's arms and perform accurate curved shots.

The use of such devices in training is significant in the training process as it contributes to the development of the player's ability to master skills quickly and perform them accurately. Moreover, it helps in efficient time utilization during training and makes training units more effective and impactful. This aligns with what Wajih (2001) pointed out, that "training with the tool elevates the trainee to better performance and achieves skill stability through practice and repetition."12

The researchers also attribute the observed improvement in the research-based skills to the exercises incorporated into the training modules using the designed device. These exercises included sequential training in the precision of offensive skills such as chest passing and ball reception. Additionally, they focused on the accuracy of shooting skills with both two-point and three-point shots. The researchers also emphasized the importance of repetition, continuous training, and the connection between proper technique and skillful performance.

[11] Issam Mohamed Amin; The Biology of Swimming Training: (Cairo, Dar Al-Kutub, 2000) page 97.
[12] Wajih Mahjoub; Learning and Scheduling of Sports Training: (Amman, Dar Wael Publishing, 2001) page 48.

This aligns with what Emad Al-Din (2007) mentioned, that "the development and improvement of performance primarily depend on the repetition of the skill, the number of successes and failures, leading to the highest level of compatibility where the player can succeed in performing the skill in alignment with its goal."13

4-3 Presentation and Discussion of the Skill Test Results for the Experimental and Control Groups in the Post-Tests

Table (6) Comparison of the Significance Levels of the Post-Test Skill Results between the Control and Experimental Research Groups.

| auditions | Unit of measurement | control | | experimental | | Calculated T value | Sig | Significance |
|---|---|---|---|---|---|---|---|---|
| | | M | SD | M | SD | | | |
| Reception | degree | 4.833 | 0.983 | 7.000 | 0.894 | 4.540 | 0.006 | Significant |
| Chest pass | degree | 18.833 | 1.940 | 23.166 | 1.834 | -3.884 | 0.012 | Significant |
| Two-Point Jump Shooting | degree | 8.500 | 1.516 | 12.833 | 2.136 | -3.889 | 0.012 | Significant |
| Three-Point Jump Shooting | degree | 10.833 | 1.940 | 13.000 | 2.529 | -3.388 | 0.05 | Significant |

At a significant level of less than or equal to 0.05.

Based on Table 6, it is evident that there are significant differences in the post-test skill results between the control and experimental research groups, favoring the experimental group. Researchers attribute these differences to the effectiveness of the designed device in expanding the trainees' perceptions and creating training environments that capture the players' attention, prevent feelings of boredom, and reinforce the training unit content.

Additionally, the exercises conducted during the training units, with their repetitions and performance on the designed device, contributed to the development of the accuracy of the skills under investigation. Therefore, the training process using the devices has become more beneficial than without them. It has also contributed to the improvement of the physical abilities related to the skills under investigation, in addition to enhancing the skill performance level of these skills.

This aligns with what Nahida (2013) concluded that "assistive tools contribute to the development of physical and motor abilities specific to specialized efficiency." 14

The researchers also believe that the use of tools and devices in training enhances the physical and skill-related abilities of the player, enabling them to perform the skill better. This is precisely what

[13] Emad Al-Din Abbas Abu Zeid; Planning and Scientific Foundations for Building and Preparing a Team in Team Sports, Theories and Applications: (Alexandria, Manship Al-Maaref Publishing, 2007) page 274.
[14] Nahida Abdel Zeid; Methods in Motor Learning, 2nd Edition: (Lebanon, Dar Al-Kutub Al-Ilmiyya, 2013) page 171.



DOI: 10.33687/jhssr.003.02.000316

happened in the training units of the experimental group, which exhibited better results than the control group in the post-tests for these skills.

This is corroborated by what Mohammed (2012) stated, "The use of training devices and tools stimulates the thinking of trainees, creates multiple opportunities for thinking, and arouses the learner's motivation to exert effort in training without feeling bored. Devices and tools serve as a means of preparing the trainee both mentally and physically, which helps in the development of various mental capacities, positively affecting the mastery and enhancement of skills." 15

The researchers also attribute the improvement in the accuracy of performing skills (chest passing, ball reception, and shooting with two and three points) to the extensive repetitions of these skills by the experimental group, which were carried out in the context of using the designed device. These repetitions created adaptation within the experimental group and led to the development of their precision in performing the research-based skills. This was achieved through the adjustment of techniques using the device designed by the researchers and applied to the experimental group in training units with fixed timings and a scientific approach. This led to an improvement in the skill level of the players in the experimental group through the exercises used with the designed device.

This aligns with what Mahmud (2001) emphasized, stating that "there is a scientific fact that must be highlighted, which is that exercises used in training programs lead to performance improvement if they are based on scientific principles, organized under good training conditions, and supervised by specialized trainers. Training programs organized according to scientific principles contribute to the physical and skill development of players." 16

The researchers also believe that continuous practice during training units with the assistance of devices and tools has a positive role in enhancing excitement and enthusiasm among players. It brings a sense of joy, fun, and happiness, increasing the player's ability to stay committed to training. Additionally, this device contributes to training players both individually and collectively while reducing the effort and time required by coaches to enhance the performance level of their players.

This is consistent with what Essam Al-Din and Badri (2009) affirmed, stating that "stimulating tools transport learners to another world where they see what they want to learn in an attractive manner, encouraging them to imitate and strive to approach the image they perceive." 17

## 5 - Conclusions and Recommendations

### 5.1 - Conclusions

1. The type and format of skill exercises using the designed device had a significant impact on the development of offensive skills as outlined in the research.

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[15] Mohammed Mehdi Mohammed; The Impact of Using Interactive Video on Acquiring and Retaining the Art of Performing Olympic Lifts: (master's Thesis, University of Mosul / College of Physical Education, 2012) page 67.
[16] Muhannad Abdul Sattar Al-Aani; The Impact of a Proposed Program on Some Physical and Skill-Related Characteristics in Basketball for Youth Players: (master's Thesis, University of Baghdad / College of Physical Education, 2001) page 89.
[17] Essam Al-Din Matouli and Badri Abdul Aal; Teaching Methods in Physical Education Between Theory and Practice: (Cairo, Dar Fikr Al-Arabi, 2009) page 211.

2. The experimental group that utilized the device showed significant and better development in the research-based offensive skills compared to the control group.

3. The use of the designed device had a positive effect on enhancing the precision in performing the research-based skills.

4. The use of devices and assistive tools helps in developing both physical and skill-related abilities by instilling enthusiasm, perseverance, and excitement among players.

5.2 - Recommendations

1. It is essential for coaches to use devices and assistive tools in training units due to their positive impact on enhancing skill performance in sports.

2. The utilization of the designed device in training units should be encouraged, as it has a significant effect on improving the accuracy in skills such as ball reception, chest passing, and shooting from two and three points in basketball, across various age groups.

3. Emphasize the use of various positions and angles during training for the skill of shooting from a jumping position, as this helps develop precision in skill execution from various positions and in line with the offensive strategies set by the coach and dictated by the diverse demands of the game.

4. Conduct further research on different age groups concerning other essential and complex offensive skills in basketball.

**References**

1. Ahmed Amin Fawzi; "Basketball: History, Principles, and Basic Skills," first edition: (Alexandria, World of Sports Foundation and Dar Al-Wafaa for Printing, 2014).

2. Islam Saber Hashem; "A Program to Develop Some Visual Abilities and Its Impact on the Performance Level of Offensive Skills in Basketball for Second-Grade Basic Education Students," (Unpublished master's Thesis, Assiut University / Faculty of Physical Education, 2015).

3. Essam Mohamed Amin; "The Biology of Swimming Training," (Cairo, Dar Al-Kutub, 2000).

4. Ali Saloom Jawad; "Tests, Measurement, and Statistics in the Field of Sports," (Baghdad, Al-Tayf Printing, 2004), p. 176.

5. Ali Saloom Jawad and Mazen Hassan Jasim; "Scientific Research: Fundamentals and Methods, Hypothesis Testing, Experimental Design," (Iraq, Najaf, Dar Al-Diyaa for Printing and Design, 2011).

6. Emad Al-Din Abbas Abu Zeid; "Planning and Scientific Foundations for Team Building in Team Sports: Theoretical and Applied Theories," (Alexandria, Manshaat Al-Ma'arif, 2007).

7. Muhammad Mahdi Muhammad; "The Impact of Interactive Video Usage on Acquiring and Retaining the Art of Olympic Lifts," (master's Thesis, University of Mosul / College of Physical Education, 2012).

8. Mahmoud Dawood Al-Rubaie; "Cooperative Learning Strategies," first edition: (Najaf, Dar Al-Diyaa for Printing and Design, 2008).



DOI: 10.33687/jhssr.003.02.000316

9. Mohannad Abdul Sattar Al-Ani; "The Effect of a Proposed Program on Some Physical and Skill Attributes in Basketball for Young Players," (master's Thesis, University of Baghdad / College of Physical Education, 2001).

10. Nahida Abdul Zeid; "Methods of Motor Learning," second edition: (Lebanon, Dar Al-Kitab Al-Ilmiyya, 2013), p. 171.

11. Hind Muhammad Amin; "The Effect of Some Preferred Learning Methods According to Sensory Modeling Using Assistive Tools in Developing Some Motor Abilities and Learning Peaceful Shooting in Basketball for Students," (Unpublished Ph.D. Thesis, University of Babylon / College of Physical Education and Sports Sciences, 2017).

12. Wajih Mahjoub; "Learning and Scheduling Sports Training," (Amman, Dar Wael for Publishing, 2001).

13. Wadih Yassin Al-Tikriti and Mohammad Hassan Al-Obaidi; "Statistical Applications and Computer Uses in Physical Education," second edition: (Mosul, Dar Al-Kutub for Printing, 1999).

14. Yasar Sabah Jassim; "Basketball Fundamentals," second edition: (Iraq, Diyala, Central Printing House, 2006), pp. 285-286.

## Appendix (1)

The skill exercises used with the open device in the main part of the training unit are as follows:

1. Performing the chest pass on the device, receiving the ball from the device, then dribbling and moving forward towards the device to perform the skill of shooting from a two-point jump from in front of the basket, then returning backward to repeat the performance. The distance between the player and the device is (2) meters.

2. Performing the chest pass on the device, receiving the ball from the device, then dribbling and moving forward towards the device to perform the skill of shooting from a two-point jump from the right angle of the free-throw line, then returning backward to repeat the performance. The distance between the player and the device is (2) meters.

3. Performing the chest pass on the device, receiving the ball from the device, then dribbling and moving forward towards the device to perform the skill of shooting from a two-point jump from the left angle of the free-throw line, then returning backward to repeat the performance. The distance between the player and the device is (2) meters.

4. Performing the chest pass on the device, receiving the ball from the device, then dribbling and moving forward towards the device to perform the skill of shooting from a three-point jump in front of the basket outside the arc, then returning backward to repeat the performance. The distance between the player and the device is (4) meters.

5. Performing the chest pass on the device, receiving the ball from the device, then dribbling and moving forward towards the device to perform the skill of shooting from a three-point jump outside the arc from

the right side, then returning backward to repeat the performance. The distance between the player and the device is (4) meters.

6. Performing the chest pass on the device, receiving the ball from the device, then dribbling and moving forward towards the device to perform the skill of shooting from a three-point jump outside the arc from the left side, then returning backward to repeat the performance. The distance between the player and the device is (4) meters.

Appendix (2)

Examples of training units used in the experiment.

Training Unit Model for the First Week

Training Unit (1) Duration of Exercises (30.5) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | First exercise | 4s | 8 | 24s | 2 | 120s | 64s | 576s | 640s |
| 2 | Third exercise | 4s | 8 | 24s | 2 | 120s | 64s | 576s | 640s |
| 3 | Fifth exercise | 5s | 8 | 30s | 2 | 120s | 70s | 480s | 550s |

Training Unit Model for the Second Week

Training Unit (4) Duration of Exercises (35.2) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Second exercise | 4s | 10 | 24s | 2 | 120s | 80s | 672s | 752s |
| 2 | Fourth exercise | 5s | 8 | 30s | 2 | 120s | 80s | 660s | 740s |
| 3 | Sixth exercise | 5s | 8 | 30s | 2 | 120s | 80s | 540s | 620s |



DOI: 10.33687/jhssr.003.02.000316

Training Unit Model for the Third Week

Training Unit (7) Duration of Exercises (32.36) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | First exercise | 4s | 9 | 24s | 2 | 120s | 72s | 624s | 696s |
| 2 | Third exercise | 4s | 9 | 24s | 2 | 120s | 72s | 624s | 696s |
| 3 | Fifth exercise | 5s | 7 | 30s | 2 | 120s | 70s | 480s | 550s |

Training Unit Model for the Fourth Week

Training Unit (10) Duration of Exercises (35.2) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Second exercise | 4s | 10 | 242s | 2 | 120s | 80s | 672s | 752s |
| 2 | Fourth exercise | 5s | 8 | 30s | 2 | 120s | 80s | 660s | 740s |
| 3 | Sixth exercise | 5s | 8 | 30s | 2 | 120s | 80s | 540s | 620s |

Training Unit Model for the Fifth Week

Training Unit (13) Duration of Exercises (38.43) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Second exercise | 4s | 11 | 24s | 2 | 120s | 88s | 720s | 808s |
| 2 | Fourth exercise | 4s | 11 | 24s | 2 | 120s | 88s | 720s | 808s |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | Sixth exercise | 5s | 9 | 30s | 2 | 120s | 90s | 600s | 690s |

Training Unit Model for the Sixth Week

Training Unit (16) Duration of Exercises (39.86) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Second exercise | 4s | 10 | 24s | 2 | 120s | 80s | 672s | 752s |
| 2 | Fourth exercise | 5s | 10 | 30s | 2 | 120s | 100s | 780s | 880s |
| 3 | Sixth exercise | 5s | 10 | 30s | 2 | 120s | 100s | 660s | 760s |

Training Unit Model for the Seventh Week

Training Unit (19) Duration of Exercises (42.63) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | First exercise | 4s | 12 | 24s | 2 | 120s | 96s | 768s | 864s |
| 2 | Third exercise | 4s | 12 | 24s | 2 | 120s | 96s | 768s | 864s |
| 3 | Fifth exercise | 5s | 12 | 30s | 2 | 120s | 110s | 720s | 830s |

Training Unit Model for the Eighth Week

Training Unit (22) Duration of Exercises (40.8) minutes

| S | Exercise number | duration | repetitions | Comfort | Total | Comfort between totals | Total duration | Total comfort | Total comfort & exercise |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Second exercise | 4s4 | 11 | 24s | 2 | 120s | 88s | 720s | 808s |



DOI: 10.33687/jhssr.003.02.000316

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Third exercise | 5s | 10 | 30s | 2 | 120s | 100s | 780s | 880s |
| 3 | Sixth exercise | 5s | 10 | 30s | 2 | 120s | 100s | 660s | 760s |