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The Effect of Exercises (Physical-Skill) with Added Weights of the Arms and Legs on Improving the Explosive Power and Accuracy of Handball Shooting Skill for Young Players

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ABSTRACT

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Keywords:
(Physical - skill) exercises with added weights, explosive power, handball shooting skill.

The current research aims to prepare exercises (physical-skill) with added weights for the arms and legs and to know their effect on improving the explosive power and accuracy of the skill of shooting in handball for young players.

To achieve this goal , the researchers used the experimental method and the design of the two equal groups in order to suit the nature of the research problem.

As for the research community, it was represented by the players of Al-Salman Club in handball for the sports season 2024-2025. The number of players reached (14) players who were distributed into two groups with (7) players for each group.

Then the researchers determined the research variables, which were (the explosive power of the arms, the explosive power of the legs, the accuracy of the handball aim) and then they started applying the pre-tests to the research sample, and then they performed homogeneity and parity in order to make the two research groups on the same starting point, and then they started applying the skill physical exercises with added weights, which were applied for 8 weeks at a rate of three units per week, as the exercises were applied on (Saturday, and Monday and Wednesday) of each week with (24) units using the high-intensity interval training method with an intensity ranging from (80-95)%, as the added weights were placed in the arm weighing half a kilo as well as in the legs, and after the completion of the exercise application period, he started the post-tests and collected the statement, he used the statistical program (SPSS) for the purpose of analyzing the results, and accordingly, the researcher concluded that the exercises (physical) The added weights of the arms and legs prepared by the researcher contributed to the development of the explosive power of the arms and legs, as well as to the improvement of the shooting skill of jumping with a handball.

1. Introducing the research

1-1 Introduction and Importance of the Research:

The current world has witnessed development in various aspects as a result of the growth of scientific knowledge and benefiting from the results of studies and researches in the field of sports, with the aim of reaching the development of the sports levels of the players, and achieving the best achievement. Achieving new numbers requires change and diversification in the use of training methods, methods and continuous tests to identify the weaknesses in all factors that affect the form of performance for the purpose of developing them to reach the desired goal (sadeq: 2025 .

The training process contributes to the athletes' reaching high levels through the integrated numbers of all physical and skill aspects, which made experts and specialists look for modern and diverse means that include a training pattern that supports the training methods used to raise the level of performance of athletes, including weight training.

Training with added weights is one of the methods that has a role in improving physical fitness and increasing muscle strength and endurance, as it depends on adding additional loads to the body during the application of sports movements in order to increase resistance, and this training is used in many sports events, including handball.

The game of handball is one of the team games with a wide and large spread because it contains many skills, including defensive and offensive skills, including the skill of shooting from jumping high, which is one of the most important skills, through which the team can score a direct goal and give it precedence by advancing and surpassing the opposing team .

The game of handball requires an emphasis on the development of all special physical qualities because of its clear impact on the application and integration of the skill and physical aspect, and explosive power is one of the most important physical qualities that must be available in the handball player because it is related to the integration of offensive skill performance in the game of handball.

This requires a kinetic transfer in which the force is transferred between the parts of the body, and it is employed in a way that ensures that the strike is as strong as the player can achieve the required force. In the laboratory, it is related to explosive force, which is the maximum muscle contraction of the force associated with speed to throw the ball once. Hence, the importance of the research lies in an attempt by the researcher to reach a high level of shooting skill by developing skillful physical exercises with weights.

1-2 Research Problem

The problem of the research lies in answering the following question:

- Does the exercises (physical-skill) with the added weights of the arms and legs have an effect on improving the explosive power and accuracy of the handball shooting skill of young players?
- Is there a difference between the application of exercises prepared by the researcher and the traditional exercises prepared by the trainer?.
- If there is a difference between the exercises prepared by the researcher and the traditional exercises prepared by the trainer, which of them is preferred?.

1-3 Research Objectives

1. Identifying the effect of exercises (physical – skill) with added weights of the arms and legs in improving the explosive power and accuracy of the shooting skill of handball for young players.

2. Identify the differences between the application of exercises prepared by the researcher and the traditional exercises prepared by the trainer.
3. Identifying the preference in influencing the research variables between the exercises prepared by the researcher and the traditional exercises prepared by the trainer.

1-4 Research Hypotheses:

1. Exercises (physical – skill) with added weights for the arms and legs have a positive effect on improving the explosive power and accuracy of the handball shooting skill for young players.
2. There are differences between the application of exercises prepared by the researcher and the traditional exercises prepared by the trainer.

1- 5 Research Areas:

1-5-1 Human Field: Al-Salman Club handball players for the 2024-2025 sports season.

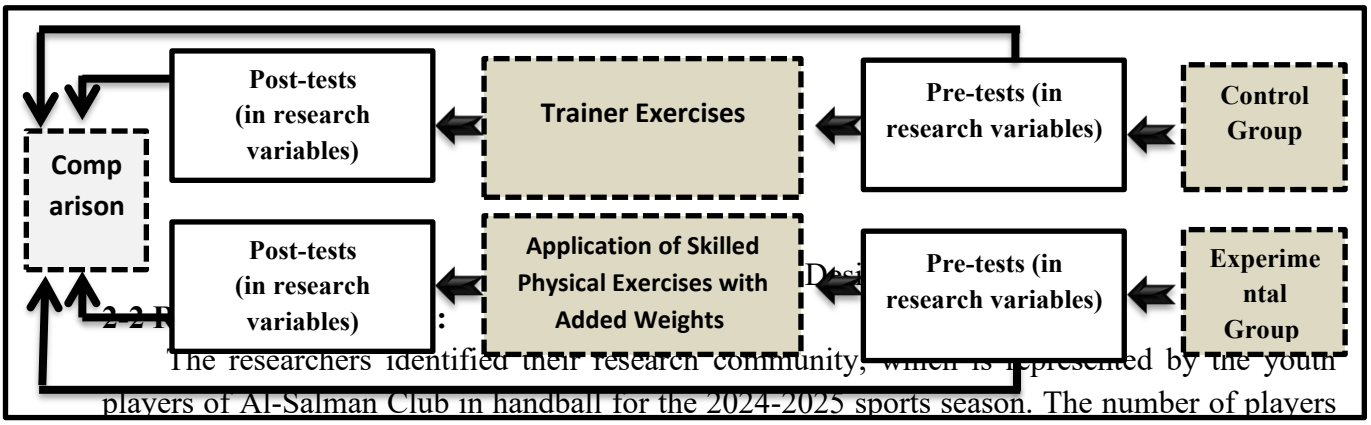
1-5-2 Temporal Domain: For the period from 10 / 3 /2025 to 5 / 6 /2025.

15-3 Spatial Domain: The Closed Hall in Muthanna Governorate.

2. Research Methodology and Field Procedures:

2-1 Research Methodology:

The researchers used the experimental method and the design of the two equal groups in order to suit the nature of the research problem and Figure (1) illustrates this.



2-2 R **:**

The researchers identified their research community, which is represented by the youth players of Al-Salman Club in handball for the 2024-2025 sports season. The number of players reached (14) players who were divided into two groups with (7) players for each group.

2-3 Means of Information Collection :

2.3.1 Data collection methods

After surveying the sources and literature related to the current research, the researchers used tests (explosive power of the preferred arm, explosive power of the legs, and the skill of shooting accuracy with the handball) as the primary means of data collection.

2.3.2 Devices and tools used

- Tape measure .
- A medical ball weighing (3) kg .
- Space area.
- **Smooth wall.**
- **Chalk.**

- Handball court **(goals, 6 balls).**
- Two squares (60×60 cm) hanging in the top corner of the goal.
- A personal computer (Lab Tob) of Chinese origin.
- Scientific calculator (Casio) type of Thai origin.
- Stationery (papers and pens).
- Whistle .

2-4 Description of the measurement of research variables

1. **Medical Ball Pushing** (Ali Salman Al-Tarifi: 2013: 47):

- **Test objective: Measure the explosive power of the player's favorite arm**.
- **Instruments**: Measuring tape, medical ball weighing (3) kg, space area.
- **Performance Specifications: The** tester stands facing the throwing strip, holds the ball with the preferred arm, then bends the knees, swings the free arm, and throws forward for the farthest distance.
- ***Scoring***: The distance is calculated in meters and the closest centimeter from the throwing edge to the nearest trace of the ball from the edge of the circle.

Figure (1)
Shows the explosive power test of the preferred arm.

2. **Vertical jumping from stability (Sargent) (Muhammad Sobhi Hassanein: 1997: 56).**

- **The objective of the test: to measure the explosive power of the legs.**
- **Tools : Smooth wall , chalk , tape measure**
- **Test Procedures: The** player is instructed to stand next to the wall from the appropriate position to jump up from the standing position, swing the arms and bend the knees half a bear, and jump to the maximum possible vertical distance to the wall showing the signal made by the player**.**
- **Test Description: The tester immerses the fingers of the hand in Manzia from a standing position and the laboratory is facing the wall, the tester tries to jump vertically to the maximum distance he can reach to make a sign on the board or (wall).**
- **Test Instructions:**

- **First marks are placed before jumping (by extending arms high from standing facing the wall), then a second jumping mark, and the distance between the two marks expresses the test's score on the test (the amount of jumping)**
- The player is given three attempts with an interval of 15 seconds between attempts, and then his best attempt is scored.

❖ **Registration:** The average score of the three attempts is calculated.

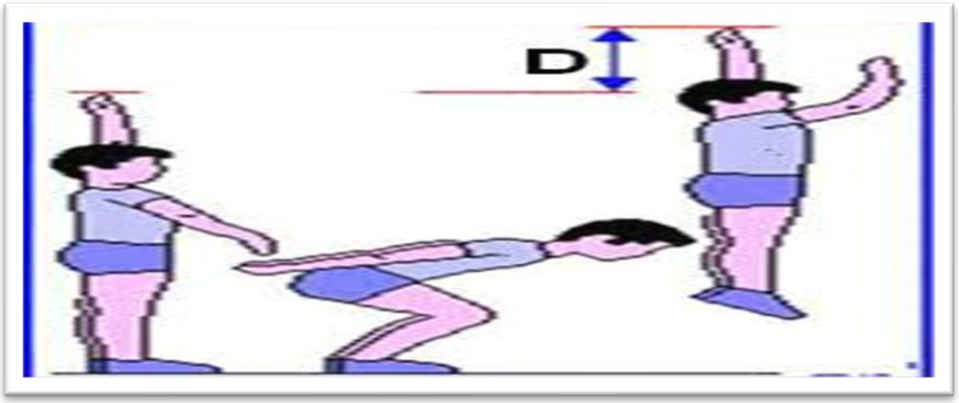


Figure (2)
The test shows the explosive power of the two legs

3. Aiming Test from Jumping (Ammar Darwish: 2004: 67):

- Objective of the test: Measure the shooting skill of jumping a handball
- Tools used in the test : (6 legal handballs, legal handballs), 2 (60×60) cm square attached tothe top corner of the goal).
- **Performance** Specifications: Aim from a point located at right angle from the middle of the goal line, which is 10 meters away from it , provided that the aim is preceded by running in a triple or double rhythm , noting that the aim should be aimed at the two specific targets placed in both upper corners of the goal, astheir dimensions reached (60×60) cm, the figure below shows this.

- Exam Conditions :

- It is not permissible to throw the ball by exceeding the specified point on the ground.
- The player performs the skill of shooting once in the right corner and again on the left side.
- The player performs the skill of shooting jumping forward.
- Each player is given 3 attempts (on each box hung in the corner of the goal).

Calculation of scores: Shooting is considered correct when the ball hits the target or if it hits its boundaries and enters, i.e., the balls that hit the target are counted from a total of 6 attempts and a score is given for each correct attempt.

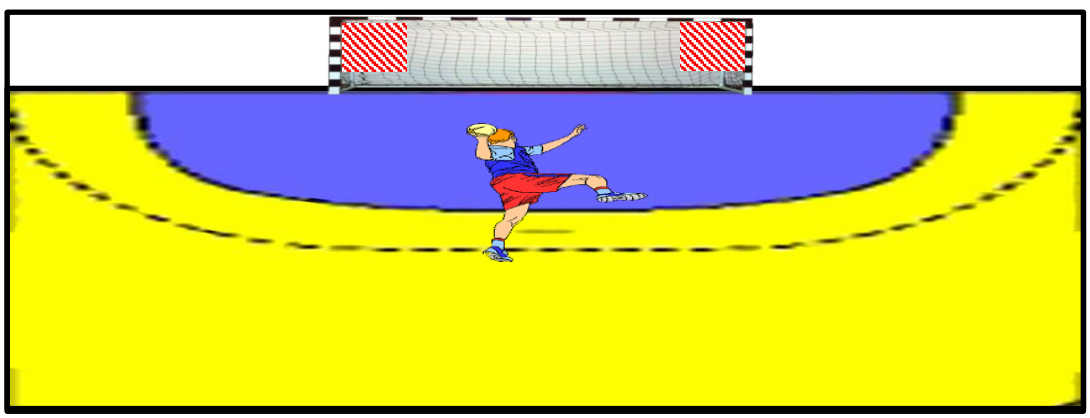


Figure (3)
Handball Shooting Skill Test Shows

2.5 Exploratory Experiment

The researcher conducted an exploratory study on (**3**) handball players from Al-Muthanna Club who are outside the sample, as this experiment was applied on 26 / 3 /2025 in the closed hall at four o'clock in the afternoon.

The aim of conducting the exploratory experiment is several points, including

- ✓ Identify the pros and cons that meet the researcher in the main tests
- ✓ The availability of the required capabilities in terms of the suitability of the designated places for conducting the tests, as well as the availability of appropriate equipment and tools for the tests.
- ✓ Knowing the safety of the devices and ensuring their validity.
- ✓ The adequacy of the auxiliary team and their understanding of the application of the test and their distribution to know their tasks when conducting the tests.
- ✓ The appropriateness of the time period specified for the test of one player and the rest of the players.

This experiment has achieved its purpose

2.6 Main experience

2.6.1 Pre-Tests

After the tests were ready, the researchers began to apply the pre-tests to the research sample of (14) players in the closed hall in Muthanna Governorate, and the researchers fixed all the test items in terms of time and place in order to benefit from them in the post-tests, as the tests were applied on 1/ 4/2025 at four o'clock in the afternoon.

2.6.2 Homogeneity and parity

In order to avoid indicators that may affect the research results of the individual differences among the players in the two research groups, and in order to make sure that the two groups are at a similar or equal level in the research variables, which are considered influential in the experiment, and for this reason, the researcher has conducted homogeneity and equivalence, and the table below shows this.

Table (1)
Homogeneity and equivalence of the two research groups

T-value		LEVENE		Experimental		Officer		Unit of Measurement	Variables
Sig	Value	Sig	Value	on	Going to	on	Going to		
0.618	0.507	0.428	0.658	1.423	4.207	1.236	4.563	meter	Explosive power of the arm
0.919	0.103	0.741	0.113	1.541	39.442	1.704	38.694	poison	The explosive power of the two legs
0.753	0.320	0.354	0.904	1.356	3.149	1.412	3.024	degree	Hand Ball Aim

The above table shows that the significance level value of the Levine test and the t-test for the independent samples was greater than the error ratio (0.05), so this is a proof that there are no differences between the two groups in the pre-tests.

2.6.3 Plan for the application of skilled physical exercise with added weights

The researchers began to apply the skill physical exercises with added weights on the experimental group sample and under their direct supervision for the period from 5/4/2025 to 28/5/2025, and they included the exercises as follows:

- The exercise took 8 weeks to apply at a rate of three units per week.
- The exercises were applied on Saturday , Monday, and Wednesday of each week.
- The total number of units reached (24) units.
- The researchers took into account the gradation of the level of training from easy to difficult.
- The researchers took into account the ripple and gradation when setting the exercises, as the researchers adopted (2:1) between the weeks and between the units.
- The training intensity is designed based on the high-intensity interval method with an intensity ranging from (80-95%).
- The rest period between repetitions (1:2) is designed in the sense that the rest period is twice the performance period between repetitions and (1:3) between combinations.
- The added weights are placed in the arm weighing half a kilo as well as at the legs.

2.6.4 Post-tests

After completing the application of the harmonic exercises, the researcher began to apply the post-tests on the sample of the control and experimental groups, and the researchers were keen to provide as much as possible the same spatial and temporal conditions as in the pre-test, as it was applied on 29/5 /2025 at four o'clock in the afternoon.

2-7 Statistical Methods Used in the Research:

The researchers used the statistical software (IMB v27.1 – SPSS) to process the data and show the results, and the following is a presentation of the statistical methods used:

- Arithmetic mean.

- Standard deviation.
- Levine's value.
- T-value for independent samples
- The t-value of the correlated samples .

3. Present, analyze, and interpret the results

3-1 Presentation of the results of a comparison between the pre- and post-tests of the two research groups

Table (2)

The difference between pre- and post-tests in the research variables of the control and experimental groups

Statistical Significance	T-value		Post-test		Pre-test		Unit of Measurement	Variables	Collection
	Sig	Value	deviation	middle	deviation	middle			
Moral	0.001	4.867	1.198	5.004	1.236	4.563	meter	Explosive power of the arm	Officer
Moral	0.002	4.440	1.332	43.262	1.704	38.694	poison	The explosive power of the two legs	
Moral	0.000	5.549	1.241	4.231	1.412	3.024	degree	Hand Ball Aim	
Moral	0.000	7.563	1.047	5.862	1.423	4.207	meter	Explosive power of the arm	Experimental
Moral	0.000	7.066	1.295	49.014	1.541	39.442	poison	The explosive power of the two legs	
Moral	0.000	6.810	1.158	4.981	1.356	3.149	degree	Hand Ball Aim	

The above table shows that there are significant differences between the pre- and post-tests in the research variables for both control and experimental groups and in favor of the results of the post-tests, because the significance level value of the t-test for the correlated samples was less than the value of 0.05, which indicates the significant differences.

3.2 Presentation of comparison results between the two research groups in the post-tests

Table (3)

The difference between the control and experimental groups with post-tests in the research variables

Statistical Significance	T-value		Experimental		Officer		Unit of Measurement	Variables
	Sig	Value	deviation	middle	deviation	middle		
Moral	0.000	4.639	1.047	5.862	1.198	5.004	meter	Explosive power of the arm
Moral	0.000	5.607	1.295	49.014	1.332	43.262	poison	The explosive power of the two legs
Moral	0.000	4.397	1.158	4.981	1.241	4.231	degree	Hand Ball Aim

The above table shows that there are significant differences between the two groups in the research variables and in favor of the results of the experimental group in the post-tests, because the value of the significance level of the t-test for the independent samples was less than the value of 0.05, which indicates the significant differences.

3.3 Discussion of the results

The results showed the superiority of two groups of research in the post-tests compared to the pre-tests, and the researcher attributes the superiority of the control group to the curriculum set by the training staff, which included the application of exercises in the curriculum based on multiple play situations, and the process of increasing these situations by increasing the duties required by the training in play, which led to the improvement of performance control. "The repetition of play leads to an improvement in the accuracy of performance due to the multiplicity of situations and difficulties that accompany them during training in those stadiums, and this was reflected positively in the development of variables for this group, because the process of performance development is closely related to practice and experience, which leads to a constant change in performance, both of which are essential elements in the development of the individual, and this is what was confirmed by (Nahida Al-Dulaimi) that the learning process is a behavior that changes with experience and experience, which is all the sciences, tendencies, and abilities he acquires. Attitudes and motor skills, whether intentional or unintentional. (Nahida Abd Zaid: 2015: 29)

The researcher believes that the exercises set by the trainer and repetitions contributed to the development of variables, and this is what he points out (Wissam Salah: 2020: 24) that (raising the level only happens through repetition and continuous practice of movements and skills, in addition to continuous correction of mistakes until the construction of motor programs related to that skill).

The researcher believes that the differences in the experimental group are due to the skilled physical exercises with the added weights prepared by the researcher and the resistance contained in the exercises, because the more resistance it is possible to obtain muscle strength by mobilizing a greater number of motor units in the muscle groups, as the improvement of strength

depends on the nervous system in activating, stimulating or improving the neurological and motor function. The greater the nerve impulse of these motor units, the greater the power generated by them, and the repetition of one nerve impulse strengthens the insurrection, which is the maximum force generated by the motor unit. This is what Muhammad Abdul Hassan: 2010: 131 pointed out : "Muscle strength grows through the improvement of neural regulation mechanisms, including neural stimulation, internal neural compatibility between the fibers and units of the same muscle, and external neural compatibility between muscle groups, and thus strength grows with increasing muscle mass, and this occurs during the first weeks of training."

The researcher believes that the superiority of the experimental group over the control group in the post-test in explosive power as a result of exercises prepared with added weights contributed to the development of this trait, which is because explosive force is one of the physical qualities of importance in sports events whose achievement depends mainly on the force exerted by the body on the ground or the tool, and since shooting with a handball from jumping is one of the skills that needs a very large explosive force because it is A combination of strength and speed in the shortest possible time, it requires a high degree of muscle strength, a high degree of precision, and the ability to combine force with speed explosively, and (Amer Fakher Shagati) believes that taking into account the number of weekly training doses ranging between (2-3) training doses These exercises increase muscle size and raise the efficiency of muscle work, as well as work to link between muscle size and raise the efficiency of muscle work, so the researcher used exercises that simulate the reality of effectiveness in this variable. It was characterized by the nature of competition among students, the flexibility of using it, and the presence of the element of suspense and excitement during its performance (Amer Fakher Shaghati: 2014: 200)

4. Conclusions and Recommendations:

4.1 Conclusions:

In light of the researcher's findings through the current study, the following conclusions can be drawn:

1. The exercises (physical and skill) with the added weights prepared by the researcher contributed to the development of the explosive power of the arms.
2. The exercises (physical – skill) with the added weights prepared by the researcher contributed to the development of the explosive power of the legs.
3. The development of explosive power has reflected positively on the skill of shooting with a handball.
4. The experimental group outperformed the control group in the research variables.

4.2 Recommendations

Through the findings of the researcher in the current study, he recommends the following:

1. Trainers should pay attention to the exercises with added weights because of their role in developing explosive power .
2. Conducting other studies to apply exercises with added weights to skills other than the skill applied in the current research.
3. Conducting other studies to apply exercises with added weights to activities other than handball .

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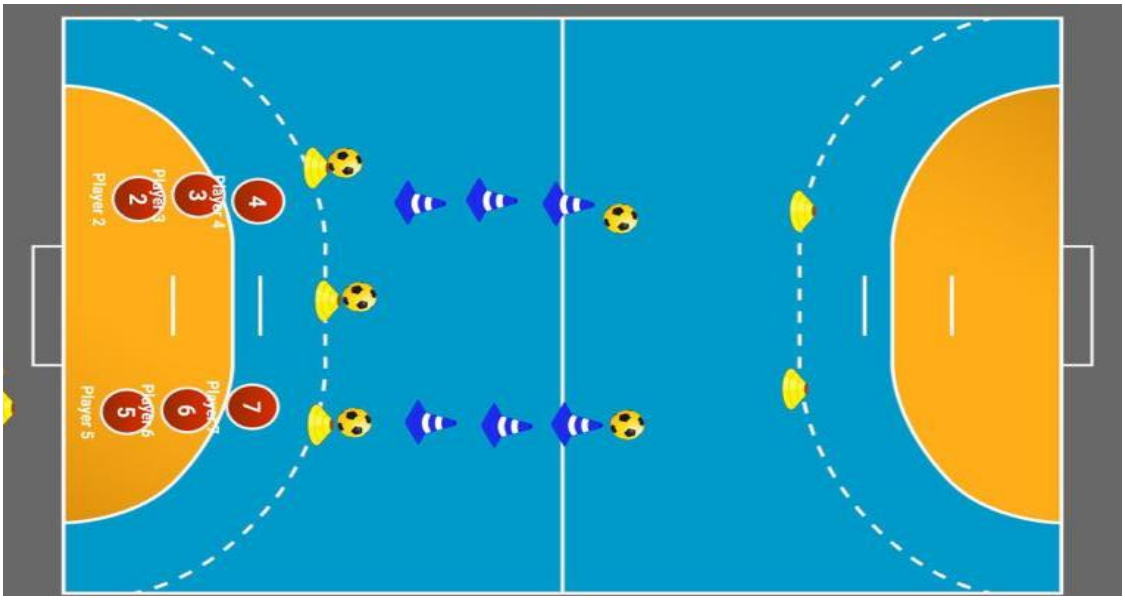
Attachment(1)

Exercise One

The players stand in the form of two groups on the 6m line with three wooden boxes in front of them with medical balls on top of them, the player tries to repeat touching one of the balls and

successively to both sides until he hears the coach's whistle to start (Zakzak) between the markers, then receive the ball after the markers, to perform the tapping and then aim from above the wooden box on the 9m line



Exercise II

The player stands in front of the obstacles, as he performs jumping movements over the obstacles in front of him, then tricks the player and moves on the color of the indicator determined by the coach, to move towards and then aim from over the fixed barrier wall.