



**THE IMPACT OF PROPOSED EXERCISES IN THE METHOD OF  
PLYOMETRIC TRAINING IN THE DEVELOPMENT OF  
EXPLOSIVE POWER AND SOME BASIC SKILLS OF  
HANDBALL CATEGORY (U17)**

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**Abstract:**

This study aimed to investigate the impact of plyometric training method on developing the explosive power and some basic skills in handball, by performing an experimental study where researchers chose one group pattern. This study was fulfilled on a sample of 12 players of Wafaa club in Ainwasara that belongs to Handball association of wilaya of Blida. After applying the suggested exercises, both pre-test results and post-test results of the explosive power (for upper and lower limbs) and some basic skills (performing the skills of aiming from jumping, passing and receiving the ball, dribble) were collected. The researchers treated these results statistically using arithmetic average, standard deviation, Pearson correlation coefficient, T test, therefore, they came to the fact that there are significant statistical significance for dimensional tests in the physical tests (the explosive power of the arms, the explosive power of the legs), and there are also differences of statistical significance for dimensional test in skills tests (aiming from jumping, passing and receiving the ball, dribble). Basing on that, the researchers recommend the necessity of encouraging the coaches on using the plyometric training method due to its big importance in developing the physical and skills sides and avoiding the traditional followed methods. In addition, they also emphasize the necessity of linking between some kinetic and physical abilities and also the performance of the different skills in handball as well as adopting some plyometric

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training exercises in order to develop the explosives power which is very imperative for many skills.

**Keywords:** plyometric training, explosive power, basic skills of handball

## 1. Introduction

Handball is considered one of the sports games which needs to prepare the players physically, technically, schematically and psychologically for reaching the highest levels of sports. Thus, physical preparation is the basic cornerstone of handball which is a sport activity that depends on mastering the basic skills as well as the physical attributes. The process of linking the skill with each other is a must to reach the highest sports levels. However, physical preparation is a very important step towards the preparation of the team for best performance in matches. Ali Ben Saleh says that physical preparation is merely a development of the physical and kinetic attributes that play a big role in sports matches and mostly depends on their degree of development of sports results (Ali ben Saleh, 1994, p. 255).

The muscular power is a basic element and main influential factor in the technical performance in training and competitions, with differentiations in the degree of relying on them in sports games such as handball. Specialized researchers in sports training agree on the importance of each of explosive power, thus the player having a big explosive power can –due to it- jump and set a wall against the shots on goal or aim with all its kinds and skillfully.

Sports training methods are numerous and all aim to develop the technical and physical performance level in order to reach advance ranks in the different activities. Therefore, coaches want to reach the selection of the best methods of training and apply them and use the most modern ways that suit the specialized kind of activity. This is as an attempt to reach the investment of the most important physical abilities of the defined type of activity because of their direct impact on increasing the physical and technical levels of performance (Mufti Ibrahim Hammad, 1994, p. 66).

Nowadays, reaching the athletic achievement is necessary and needs many necessary requirements to work to raise the level of athletic performance and fulfilling the best achievements. This can be achieved through following the best methods and ways that can achieve it. Thus, Plyometric training method was adopted by several coaches in several countries and they achieved advanced results in volleyball, handball, basketball, football and arena games, tack games, swimming, gymnastics and weight-lifting. That is, Plyometric exercises and good level of techniques work together to

enable the progress in the level of achievement of various sporting events and skills. (Bastosi Ahmed, 1999, page 294).

As a result to the close association and the link between physical and technical preparation in handball, it has become necessary to pay attention to the elements of physical fitness, especially explosive force, which is one of the influential physical characteristics in the success of the performance of basic skills in handball.

Researchers interested in athletic training noticed that most coaches do not pay attention to the use of the different scientific methods in developing the explosives power which negatively affected their levels in fast games during performing some basic skills such as the skill of aiming, passing the ball and dribble. Thus, researchers decided to use plyometric training method to know the impact of this method on developing the explosive power and some basic skill in handball.

All that led us to propose the following questions:

- To what extent do proposed exercises following the Plyometric method affect the explosive power and some basic skills of handball players?

Through the general question, we ask the following questions:

- To what extent do proposed exercises following the Plyometric method affect the explosive power of handball players?
- To what extent do proposed exercises following the Plyometric method affect the performance of the aiming from jump skill of handball players?
- To what extent do proposed exercises following the Plyometric method affect the passing skill of handball players?
- To what extent do proposed exercises following the Plyometric method affect the dribble skill of handball players?

## 2. Research hypotheses

- The proposed exercises with plyometric method positively affect the explosive power of handball players.
- The proposed exercises with plyometric method affect the performance of the aiming from jump skill of handball players.
- The proposed exercises with plyometric method affect the performance of the passing skill of handball players.
- The proposed exercises with plyometric method affect the performance of the dribble skill of handball players.

### **3. Research aims**

This research aims at:

- Showing the importance of plyometric training method in developing the explosive power of handball players.
- Showing the importance of plyometric training method in developing the aiming skill performance of handball players.
- Showing the importance of plyometric training method in developing the passing skill of handball players.
- Showing the importance of plyometric training method in developing the plump skill of handball players.

### **4. Research methodology and field procedures**

#### **4.1 Research methodology**

Methodology is defined as a collection of processes and steps that researcher follows in order to achieve his research (Zerouati, 2002, page 119). Thus, the researcher used the experimental method with one-group approach to suit the nature of the study.

#### **4.2 Research population**

This research population was presented in the active teams at the level of the State Handball Association Blida which are (10) teams for the category of juniors (u17) including 154 players.

#### **4.3 Research sampling**

The research sample was (12) players of Wafaa club in Ain Wassara, the state of Djelfa. This Sample was intentionally selected.

#### **4.4 Research Fields**

- Human domain: A sample of active teams at the level of the State Handball Association Blida.
- Time domain: from September 3<sup>rd</sup>, 2017 to November 4<sup>th</sup>, 2017.
- Place domain: Ain Wassara, Djelfa State.

## 4.5 Research Variables

### 4.5.1 Independent variable

It is *“the variable that we use in order to measure the effect in the dependent variable. Thus, the change in its values leads to the change in the values of other variables related to it”* (Morris Angeles, 2013, p. 196).

In this study, the independent variable was defined as *“the proposed (physical and technical) exercises”*.

### 4.5.2 Dependent Variable

It is the factor that follows the dependent variable; it is defined as the variable that changes as a result to the independent variable effect, or it is the variable which we want to know the effect of the independent variable on it (Boudawd Abd al-Yamin, and Atallah Ahmad, 2009, p. 141).

In this research, the dependent variables are:

- Physical variables: the explosive power of the arms, the explosive power of the legs.
- Skills variables: Aiming from jump skill, passing skill, dribble skill.

## 4.6 The scientific foundations of the tests used in the research

**Table 1:** Shows the scientific coefficients of the tests used in the research

Test Title	Measurement unit	Application	Average	Standard deviation	Level of significance	Stability coefficient	Self-honesty
Test the explosive power of the arms	degree	First application	6.33	1.21	0.05	0.79	0.88
		Second application	6.17	0.98			
Test the aiming from jump accuracy	degree	First application	7.2	2.3	0.05	0.71	0.84
		Second application	7.6	2.04			
Test the passing and receiving	degree	First application	22.1	1.21	0.05	0.8	0.89
		Second application	22.6	2.04			
Test the dribble	degree	First application	7.73	1.21	0.05	0.82	0.9
		Second application	8.2	2.04			

From the table (01) above, it is shown that all tests are characterized by a high degree of stability, with the lowest value (0.71) in the aiming from jump accuracy test and the highest value (0.82) in dribble test. However, passing and receiving test reached a value of stability (0.8) and explosive power of the arms test reached value of (0.79). these results indicate the extent to which those two application results (test and re-test) are strongly related. From the results of table (01), it is noticed that all tests are characterized by high degrees of self-honesty, thus the lowest values in aiming from jump test reached (0.84) while the highest values in plump test reached (0.9), whereas the value of self-honesty in explosive power of arms test reached (0.88) and (0.89) in passing and receiving test.

#### 4.7 The tests used in research

- Throwing a medical ball from the stand (Potvin Andre and Jespersen Michael, 2007, p57).
- High-jump aiming test (Al-Khayyat and Al-Hayali, 2001, p. 508).
- The speed of ball passing (Kamal Abdel Hamid Ismail and Mohamed Sobhi Hassanein, 2002, p. 117).
- Running with dribbling in a straight line for a distance of 30 m (Kamal Abdel Hamid Ismail and Mohamed Sobhi Hassanein, 2002, p. 106).

#### 4.8 Statistical Methods

The SPSS 23 program was used to analyze the results of the study.

### 5. Presentation and discussion of the results

#### 5.1 Presentation and Discussion of the results of pre-test and post-test of explosive power of the arms

**Table 2:** Shows the averages and standard deviations and calculated (T) value of pre-test and post-test of explosive power of the arms

Test	Average(cm) $\bar{x}$	Standard Deviation S	Calculated (T) value	Significance
Pre-test	6.71	1.42	7.22	Statistically significant
Post-test	7.38	1.89		

From the presented results of table (02), it is shown that the average value of pre-test reached (6.71) with standard deviation (1.42). however, the average value of post-test reached (7.38) with standard deviation (1.89) while the calculated (T) value was (7.22)

and it is bigger than the scheduled (T) value which is (3.3) at the level of significance (0.05) and freedom degree (11) which indicates to the existence of significant differences in the favor of post-test. The researchers attribute this difference to the effectiveness of the proposed exercises which the researchers inserted in the training program of the research sample; especially these exercises have targeted the jumping muscles, which have evolved as a result of the use of movements similar to the movements of performance.

## 5.2 Presentation and discussion of the results of pre-test and post-test of the performance of aiming from jump skill

**Table 3:** shows the averages and standard deviations and calculated (T) value of pre-test and post-test of the performance of aiming from jump skill

Test	$\bar{X}$ Average (m)	Standard Deviation S	Calculated (T) value	Significance
Pre-test	7.3	1.64	4.66	Statistically significant
Post-test	7.8	1.13		

From the presented results of table (03), the value of pre-test average reached (7.3) with standard deviation (1.64), while the value of post-test average reached (7.8) with standard deviation (1.13), however, the calculated (T) value reached (4.66) which is bigger than the scheduled (T) value (3.3) at the level of significance (0.05) and freedom degree (11), which indicates to the existence of significant differences in the favor of post-test. The researchers attribute that difference to the effectiveness of the proposed exercises and also the progress occurred in the explosive power, which contributed in developing the aiming from jump skill. Although the existence of significant differences, researchers see that the development of the aiming from jump skill requires the development of some physical and kinetic abilities beside the development of the explosive power of the legs, this what (Hassanein and Abdel Moneim, 1997, p20) emphasized “*the need for physical abilities is big and important for the integration of technical performance and upgrading the level*”, in addition, researchers agree with (Hajjaj, 1995, p53) “*improving the physical abilities have efficient impact and basic and direct role in enhancing the level of technical performance, and without developing those requirements, it is hard to master the specific technical skills.*”

### 5.3 Presentation and discussion of the results of pre-test and post-test of the performance of passing and receiving skill

**Table 4:** presents the averages and standard deviations and calculated (T) value of pre-test and post-test of performing the passing and receiving skill.

Test	Average(degree) $\bar{x}$	Standard deviation S	Calculated (T) value	Significance
Pre-test	22.3	1.22	5.72	Statistically significant
Post-test	23.8	1.04		

From the presented results of table (04), it is shown that the average value of pre-test reached (22.3) with a standard deviation (1.22). However, the average value of post-test reached (23.8) with standard deviation (1.04) while the calculated (T) value reached (5.72) which is bigger than the scheduled (T) value (3.3) at the level of significance (0.05) and freedom degree (11), which indicates the existence of significant differences in favor of post-test. Researchers attribute that difference to the proposed exercises which affected the level passing and receiving skill and also development occurring in the explosive skill.

### 5.4 Presentation and discussion of the results of pre-test and post-test of the performance of dribble skill

**Table 5:** The averages and standard deviations and the calculated (T) value of pre-test and post-test of dribble skill

Test	Average (degree) $\bar{x}$	Standard deviation S	Calculated (T) value	Significance
Pre-test	7.8	1.32	5.22	Statistically significant
Post-test	8.6	1.54		

From the results shown on the table (05), it is shown that the average value of pre-test reached (7.8) with standard deviation (1.32), while the average value of post-test reached (8.6) with standard deviation (1.54) whereas the calculated (T) value reached (5.22) which is bigger than the scheduled (T) value (3.3) at the level of significance (0.05) and freedom degree (11) which indicates the existence of significant differences in favor for post-test, which means that the proposed exercises contributed in the development of dribble skill level.



## 6. Conclusion

Founding on what was concluded from the measurements and the tests used in the study and within the study sample which is Wafaa club in Ain Wassara (u17) category, which trains three times a week, and through the proposed exercises which were inserted by the researchers in the training program that is applied on the research sample, in the light of the study aims and tools, and the used materials and available capabilities, and through the collection of the accurate information, and basing on the followed scientific procedures in the same context and basing on the results of the statistical pattern, we could reach the following conclusion:

1. The proposed exercises in the plyometric training method significantly developed the level of the explosive power of the arms of handball players (u17) category).
2. The proposed exercises in the plyometric training method slightly developed the performance of aiming from jump skill of handball players (u17) category. Thus, The researchers point to the need to develop other physical and motor capabilities alongside explosive power.
3. The proposed exercises in the plyometric training method significantly developed the level of performance of passing and receiving skill of handball players (u17) category.
4. The proposed exercises in the plyometric training method significantly developed the level of performance of dribble skill of handball players (u17) category.

## 7. Recommendations

1. Coaches should encourage the use of plyometric training method because of its importance in developing the physical and technical sides, and avoid the use of the used traditional methods in training.
2. Plyometric training method should not be used more than two training units per week.
3. Pay attention to the performance of flexibility and prolongation exercises before and after each training unit.
4. The need for selecting the loads according to what suits the players' levels, especially when applying the plyometric training method.
5. Emphasizing the need to link the physical and also technical abilities with the performance of the various skills in handball.

6. The need to continue the training on the specific physical abilities during the completion period to ensure the stability of the improvement of the technical performance level.

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