# EFFECT OF 8 WEEKS PLYOMETRIC EXERCISES ON SOME OF FACTORS PHYSICAL FITNESS AND MOTOR SKILLS

\*Yahya Houshyar<sup>1</sup>, Bahador Ilkhani<sup>1</sup> and Mohammad Hassan Solhjou<sup>2</sup>

<sup>1</sup>Education Ministry of Firouzabad, Firouzabad, Iran <sup>2</sup>Department of Physical Education, Jahrom Branch, Islamic Azad University, Jahrom, Iran \*Author for Correspondence

# ABSTRACT

The Aim of This Study Was to Investigate the Effects of Plyometric Exercises on Physical Fitness and Motor Skills Indicators in FiroozAbad City. Subjects were a group of 20 people of handball players city of FiroozAbad formed. The plyometric exercises to train three days per week for eight weeks, and they did. Participants were pre-and post-tests. Plyometric exercises independent variables and change some parameters of physical fitness and fitness-related variables were investigated. The two methods for analyzing data and descriptive statistics, inferential statistics, paired T alpha level was  $\alpha = 5\%$ . The results showed that plyometric exercises on, muscular strength and, agility and power and has a positive effect. Also plyometric exercise on triple shooting and 3 steps shooting have a positive effect, and shooting on the move with negative effect. As regards to this matter that most of the handball techniques need to jump, sudden shifts explosive movements in hands and legs implementation of plyometric exercises on handball athletes can effects on some fitness factors like power agility and muscle power on the other hand because implementation most sport technique need fitness factors so we can conclude that plyometric exercise can effect on some motion skills of handball.

Keywords: Plyometric Exercise, Fitness, Physical Fitness, Motor Skills, Handball

# INTRODUCTION

Physical Education and Sports Science is one of the spheres of human sciences, which is of utmost value in the current era. One of the most important goals of physical education and sport sciences is physical health and nurturing, and the appropriate physical health itself includes vast domains and dimensions. Marinating an appropriate body health is one of these domains, which has an important and determinant role in our daily actions, activities, and sport skills. In sports, athletes usually break their preceding records and achieve new ones. Male and female athletes, around the globe and in all sports, try to achieve better results than before, which these improvements are usually due to the athlete's increased physical, mental, and technical fitness. This increased fitness in its own turn is due to the coaches and athletes' heightened understanding from their exercises and results. Theoretical exercise is the collection of all sport related material from scientific or social sources. These data, alongside the experience and knowledge the trainer has from the athlete, is used to present an effective exercise program. Discovering appropriate methods in order to improve the motor and physical factors has been one of the most important goals pursued by sports scientists, and among them, analyzing exercise methods and their effects has been of utmost importance. Amongst these factors affecting the physical fitness, we could point out the explosive power and potency. Over the past few years, various methods have been used by different researchers and trainers in order to improve this power and potency (Alijani, 2005).

One of the effective exercise methods in order to improve the physical fitness is plyometric exercises. These exercises are used in order to improve the athletes' speed and explosive power. Plyometric exercises include some of the prevalent sport moves such as jumping, skipping, and throwing. Plyometric exercises are a series of eccentric contractions which are promptly followed by introvert contractions, which are also known as the stretch-shortening cycle. These types of contractions have a significant effect over the muscular attitude, including the lower limb muscles. These exercises could be performed with the least amount of equipment or even none at all. The most important feature of said exercises, are the improvement of the athlete's skill pattern (Alijani, 2005).

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One of the main obstacles in the way of plyometric exercise is the strict observance of safety while performing these exercises in order to prevent any harm falling upon the athlete, especially teenagers. Additionally, the belief that plyometric exercises are only effective in increasing the explosive power and merely affects athlete's absolute power has caused that most trainers do not use these exercises in the programs to increase absolute power. Could we increase the athlete's indicators of physical fitness and motor skills by performing plyometric exercises (Alijani, 2004)?

Vast studies have been inducted in this field, which most of the have regarded the effect of various plyometric exercises on the explosive power. The findings from these studies indicate that the plyometric exercises increase the power (explosive and absolute), but no comprehensive studies have been regarding other indicators of physical fitness (Alijani, 2004).

### MATERIALS AND METHODS

#### Study Method

This study analyses the effect from plyometric exercises on the physical fitness and motor skills of the FiroozAbad city handball players, which is from the type of field and functional researchers and has been conducted in a semi-empirical manner.

# Statistical Community and Sample

The statistical community for this experiment was the FiroozAbad City handball players participating in the 2012 handball tournament. In order to conduct this experiment, initially all the handball players were invited to participate within. Among the applicants, 20 were chosen and had filled in the consent form. Afterwards it was inquired via questionnaire that they would have no previous injuries, pain, or operations.

#### **Statistical Methods**

For the means of measuring the mean and standard deviation, and also drawing tables and charts, descriptive statistics were used. Also testing the study assumptions were done via inferential statistics. For this means, the paired T-test was used to initially analyze the significance of the subjects' grade progression. The entirety of the statistical calculations in this study were at the level of ( $\alpha = 0.05$ ) and via the SPSS method.

#### **RESULTS AND DISCUSSION**

#### Study Findings

In this section, the physical factors such as height, weight, and age were measured and recorded. Also in this part, the table of statistical indicators related to the variable distributions is mentioned, and the distribution histograms related to each variable are drawn respectively.

Variable	Statistical	indicator	Mean	Standard deviation
	variables			
Agility (Seconds)	Pretest		18	0.83
	Post-test		16.06	2.02
Strength (Kilograms)	Pretest		28.03	8.47
	Post-test		32.56	7.87
Muscular power	Pretest		205	0.18
(Centimeters)	Post-test		216	0.13
3-Step shot (Grade)	Pretest		7	0.97
-	Post-test		8.50	1
Declining shot (Grade)	Pretest		4.45	0.94
<b>2</b> ( )	Post-test		5.70	0.73
Moving Shot (Grade)	Pretest		5.60	0.71
	Post-test		6.01	0.75

# Table 4-4: Sample volume, least mean value and statistical data's standard deviation

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### Discussion

The current study was conducted for the goal of analyzing the effect from an eight-week plyometric exercise regime on the physical fitness and motor skills indicators of 20 subjects, which the complete analysis of the results are noted in section (4-4). The results from these studies indicate that the plyometric exercises obviously increase the power, which are strengthened by the findings from (Alam, 2011; Aminiani, 1994; Wolfart, 2005). Also the increase in the leg's explosive power due to the plyometric exercises is compatible with the previous studies done by (Karimian, 1993; Arabi, 1994). The plyometric exercises lead to the increased power and potency in the legs and speed in the runners. The activation of the motor blocks to induce an extreme and powerful contraction and the fast rocker movement in the involved muscles, and also increased movement speed is due to the plyometric exercises. Summoning more motor blocks and muscle strands related to them and reduced reaction time are also because of such exercises (Fox and Mathews, 2003). The plyometric exercises lead to increased power and are also very effective when parting the ground. Additionally, the plyometric exercises also affect the neuromuscular system and improve the muscle's capability in representing a fast response (Wilmore, translation by Moeni and Colleagues, 1999). In the field of analyzing the plyometric exercise's effect over motor skill indicators such as the 3-step shot, no studies have been conducted in order the prove or disprove the hypothesis, but studies have been inducted regarding the vertical jump which show that the plyometric exercises positively enhance the 3-step shot, which in its own place shows that the plyometric exercises have a positive and significant effect in any skill or sport that requires jumping or the use of leg power. If we conclude the vertical jump in this matter, which is part of this technique, it would be compatible with the findings from (Karimian, 1993; Pan, 1978; Karapandys, 2006).

Based on that the plyometric exercises improve the vertical jump, the trainers and researchers in the field of exercises try to identify the best training stimulus in order to further improve the performance power such as the vertical jump or the maximum acceleration. Due to the relatively high importance of the involved duty in motor compatibility and speed-force features, the ballistic and plyometric exercises lead to a significant improvement in the vertical jump (Hero and Eizokurdo, 2005). In the field of the plyometric exercise's effect on motor skills indicators such as the declining shot, no study has been performed to prove or disprove the matter, but studies have been conducted regarding the vertical jump which indicates that the plyometric exercises positively affect the declining shot, which matches the findings by (Aminiai, 1995). It seems that because the plyometric exercises affect the agility and speed, it affects the declining shot which requires both agility and speed from the entirety of the muscles. Due to the plyometric exercises strengthening the forearm muscles, it affects the better receiving of the ball and also the power and accuracy of the throw; additionally in helps maintain health during and after the dive. In the field of plyometric exercise's effect over the shot motor skill indicator no study has been conducted in order to prove or disprove the effect, which indicates that the plyometric exercises have little positive impact on sports or movements which require shooting while yet focusing on running. In this type of motor skill, the athlete is more after a dynamic equilibrium and coordination. Because the plyometric exercises do not play any role in the dynamic equilibrium and coordination, therefore the plyometric exercises could not affect the running shot. But due to the arm muscles being included in our exercises, it could affect them and therefore the accuracy of the shot. Walking is a basic skill which the person could learn from the beginning, even before the running skill (NamaziZadeh, 1998).

#### Conclusion

The eight-week plyometric exercises indicated positive effects over various physical fitness and motor skills indicators, and that all factors had a significant improvement. Some of these factors had been previously studied by local and foreign researchers and their effectiveness was observed, including the leg's explosive power, speed, and agility. But the rest of the physical fitness factors, although being used by athletes in various sports in the hope of improving via plyometric exercises but had no scientific studies backing them up, yet in this study in addition to some factors which had been briefly measured and proven before, new factors were included and all were proven at a significant rate. Of course regarding this matter, the specific method of these exercises, which all were designed based on the

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findings and researches of sport exercise physiology and body building that is an advantage compared to the previous researches, must not fall far from attention due to its significant impact on the results. But the statements from the Olympic champions and some of their trainers support the fact that such exercises were of significant help in improving the record in fields such as endurance, jumping, throwing and the ten athletics, and therefore were considered as the main course of the exercises or at least an important part of it.

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