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The Effect of Plyometric Jump to Box Training on Increasing Limb Muscle Power in Badminton Athletes

Ardian Rizki Cahya[1]✉, R Boyke Mulyana[2], Muhamad Tafaqur[3], Mulyana[4]

Sport Coaching Education, Faculty of Sport Education and Sports Health, University of Indonesia Education, Indonesia[1234]

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Abstract

The purpose of this study was to determine whether plyometric jump-to-box training can increase leg muscle power in badminton athletes. In this study using an experimental method with a one group pre-test post-test research design. Sampe in this study were UPI Badminton UKM consisting of 12 athletes. The instrument used in this study was vertical jump. Researchers gave treatment in the form of jump to box training for 12 meetings to athletes. Data analysis was carried out using the t-test. The results of data analysis show a significance value of 0.000 <0.05 then Ho is rejected. So it can be concluded that there is a significant effect of Jump to Box Plyometric Exercise on Increasing Limb Muscle Power in Badminton Athletes.

How to Cite

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✉ Correspondence Author:
E-mail: ardianrizkicahya@upi.edu

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INTRODUCTION

Badminton is a sport that is very popular and loved by many people, both young and old, both domestically and internationally. This is supported by previous research which reveals that this sport is also very popular with all levels of society, ranging from parents, young people, both men and women (Achmad Rifai et al., 2020). This is also in line with research conducted (Yuliawan & Sugiyanto, 2014). which states that badminton can play a role in integrating society in almost all fields. Thus, badminton is one of the sports that is widely played in various levels of society.

This sport requires good physical condition so that it can display maximum skills and players become stronger and more energetic. In this sport it really requires strategic, technical, mental but physical is also very important (Aisyah, 2021). So this sport requires flexibility, speed and leg muscle strength. This is in line with previous studies which reveal that muscle strength is the ability of the neuromuscular system to produce force, strength, and speed (Afdinda et al., 2021). One of them with leg strength helps an athlete›s ability to jump, change direction, and explosive movements. leg strength also plays an important role in improving performance in sports competitions (Nugroho et al., 2021).

There are several types of leg strength exercises, one of which is jump to box training. According to (Suprianti & Paripurna, 2017). Good leg muscle power is certainly obtained in good training, one of the exercises that can form good leg muscle power is Pliometric exercise, especially in the type of Jump to box exercise form. This exercise uses a bench or box, the way to do this movement is by jumping from the floor surface to the top of the box with the legs together then jumping to the floor surface with both legs simultaneously (Yanti et al., 2021). This exercise is done by jumping up to the top of the block box then jumping back down to the back like the initial attitude using both limbs together (Hartadji et al., 2022; Nugroho & Purnomo, 2018). Various studies that leg muscle power will increase along with the increase in Plyometric Exercise training (Arif & Alexander, 2019).

Based on the explanation above, the author feels interested in giving Plyometric Jump to Box Exercise to badminton athletes because the author wants to know the effect of Plyometric Jump to Box Exercise on increasing the increase in Limb Muscle Power in Badminton Athletes. The author sees that studies that discuss Plyometric jump to box training on increasing Limb Muscle Power in Badminton Athletes are still limited, so this research is expected to be able to provide results on the condition of athletes.

METHOD

This study used an experimental method, with a one group pretest-posttest design. this design includes a pretest conducted before treatment, to ensure more accurate results by comparing it with the conditions before treatment. the purpose of this study is to determine the effect between the independent and dependent variables (Sugiyono, 2015). This study involved 12 upi badminton ukm athletes. this study aims to determine the effect of jump to box training on the sample. The research instrument used is the vertical jump test to measure jump height before and after treatment.

In this study there were 12 meetings. In the first week, moderate intensity was given, with a volume of 3 sets and 10 repetitions. In the second week on the first day of training, moderate intensity was given, with a volume of 3 sets and 10 repetitions, on the second and third days high intensity was given, with a volume of 4 sets and 10 repetitions. In the third week, high intensity was given but on the first day a volume of 4 sets and 12 repetitions was given, while on the second and third days a volume of 5 sets and 12 repetitions was given. In the last week given high intensity but on the first day given a volume of 5 sets and 12 reps, but on the second day given a volume of 4 sets and 12 reps, while on the third day given a moderate intensity with a volume of 3 sets and 10 reps. At the time of recovery in the first week to the fourth week given recovery time for 2 minutes.

RESULTS AND DISCUSSION

The raw data derived from the initial and final test results had to be processed with SPSS. **Table 1** displays the test results.

Table 1. Pretest and Posttest Results

Name	Pretest	Postest
A1	50	57
A2	45	56
A3	44	65
A4	47	55
A5	52	56
A6	49	58
A7	41	60

A8	42	56
A9	44	56
A10	50	61
A11	49	60
A12	50	54

Statistical methods were then used to process and analyze the measurement-based data, as shown in **Table 1**. The raw data used for this data collection was still processed to create standardized data. Statistical software, specifically SPSS series 26, was used to analyze the data. **Table 2** displays the measurement data.

Table 2. Pretest and Posttest Results

	N	Mean	Std. Deviation	Minimum	Maximum	Sum
Pretest	12	46.92	3.605	41	52	563
Posttest	12	57.83	3.129	54	65	694

Based on data collected during pretest and posttest, as shown in **Table 2**. Before receiving therapy, the average score was 46.92; after treatment, the average score was 57.83; The standard deviation was 3,605 before treatment and 3,129 after treatment. Before receiving treatment, the minimum score is 41; After treatment, it was 54. Then, the highest possible score is 52 before therapy and 65 after treatment. Before treatment, the aggregate value was 563; After treatment, it was 694. Following descriptive data, proceed with data processing to determine a hypothesis.

The results of the normality and homogeneity tests, Ho was rejected after the pretest and posttest significant values of 0.295 and 0.129 > 0.05 were found. Therefore, both data are considered normally distributed.

Based a significance value of 0.372> 0.05 was obtained, then Ho was rejected. So it can be concluded that the data has the same group variance (homogeneous). After conducting the homogeneity test, the hypothesis test using the Paired Sample t-Test a significance value of 0.000 < 0.05 was obtained, then Ho was rejected.

Judging from **Figure 1** that the average value of vertical jump results before treatment is 46.91cm and the average value of vertical jump results after treatment is 57.83cm. Judging from this value that the jump height increases.

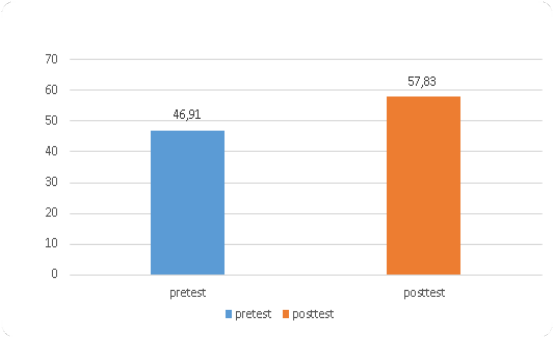

Figure 1. Percentage of Overall Limb Muscle Power at Pretest and Posttest

This jump to box exercise has been proven to have a significant impact on increasing leg muscle power in badminton athletes. Plyometric is an exercise that uses speed and strength from various movements to increase muscle strength so that this exercise can increase leg strength to perform well (Sulistyo, 2016).This is in line with previous research explaining that this pliometric exercise is a popular exercise among coaches that has the characteristics of training with jumping or bouncing limbs and requires the explosive ability of leg muscles or arm muscles (Putra et al., 2023).

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Leg muscle strength allows athletes to make explosive jumps, move quickly to catch the shuttlecock, and make sudden changes in direction. In badminton, these abilities determine success in competitive situations (Kusuma et al., 2022). Therefore, training that focuses on strength development is essential to support optimal performance in athletes (Madani et al., 2024).

The jump to box exercise involves an explosive jump to a higher level (box), which is designed to activate fast muscle fibers. This increases the strength and speed of leg muscle contraction. In addition, this movement helps train coordination, body stability when landing on the box. With consistent repetitions, this exercise can strengthen leg muscles (Nugroho & Purnomo, 2018).

Based on research conducted by (Arif & Alexander, 2019) plyometric jump to box training

was shown to have a positive impact on increasing leg strength in volleyball players. Although the study was not sport specific, it is relevant to this study because it investigated jump to box training to measure leg strength improvement. With proper program management, this exercise can be one of.

CONCLUSION

The findings demonstrated that plyometric jump to box training significantly increases badminton players' leg muscular power. In order to boost athlete performance, particularly when doing explosive movements like jumps, smashes, and quick movements on the field, it is crucial to increase the explosive strength of the leg muscles, which this exercise effectively does. It entails strong, quick contractions of the muscles, which directly trains the muscles to generate power quickly.

Based on these findings, Plyometric Jump to Box can be recommended as part of a structured physical training program for badminton athletes to improve leg strength and explosive ability. Regular and consistent use of this training method is expected to help athletes achieve optimal performance on the field, especially in key techniques such as smash and footwork.

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