

# The Different of Box Jump, Burpee, and Tuck Jump Exercise Effects to Enhance Power of Leg Muscles and Speed

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## ABSTRACT

This research aims to analyze the influence of difference exercise box jump, burpee, and tuck jump to power against the limb muscles and speed. Fifty-two students were selected according to criteria will be done pretest to determine the Division of the group by means of ordinal pairing. The process of retrieval of data is done with the test power limb muscles using Jump DF and speed tests using a 30-meter sprint at the time of pretest and posttest. Given the form of exercise for 6 weeks for each group and treatment 3 times in one week. The research results obtained is the percentage increase in limb muscles power of 11% and the speed of 2% on box jump exercises greater than a third group to another. It can be concluded that there are significant effects caused by box jump, burpee and tuck jump exercises to increased power and speed of limb muscles as seen from the test sample paired t-test and there is a difference significant influence between exercises and box jump, burpee and tuck jump to increased power and speed of limb muscles as seen from MANOVA test.

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## 1. Introduction (Pendahuluan)

Coaching talent and training should begin from an early age. The exercise is a process to improve the physical quality for better and more systematic way. Exercise can also be defined as a process that is carried out progressively to achieve the optimal performance (Bompa, 2015). One of the goals and objectives of physical exercise is to make the perfect technique.

The physical condition is one of the very important elements in conducting the exercise. There are several physical components in sports, such as strength, endurance, power, speed, balance, coordination, agility, precision and reaction. (Harsono, 2015). Based on physical components, the researchers only focused on two physical components that will be examined in this study which are power and speed. Power is the combination between strength and speed. So, limb muscles power is the ability to move the limb muscles with maximum strength in a short time.

Whereas, the speed can be defined as the ability of a person to move from one place to the other as quick as possible (Mylsidayu and Kurniawan, 2012).

There are several models of exercises to improve the physical condition of students mainly to increase strength and speed, plyometric exercises is one of the methods. Plyometric exercise is often used by coaches on his program to increase strength and explosive power. The principles of this exercise is muscle condition must be good at the time of contracting muscle lengthening (eccentric) or muscle shortening (concentric) (Chu and Myer, 2013). In any physical activities, involvement of the limb muscles can not be separated. Almost all sports require lower extremity as a buffer and movers. In this research, the samples will be given exercises that focused on the muscles of the lower extremities using three forms of exercise from plyometric box jump, among others, burpee and tuck jump.

All form of exercises involve the same muscle,

which is rectus femoris, gluteus on maximus, vastus intermedius, vastus medius gluteus and lateral. However, it is located on the physical quality of the movement. When the box jump is performed, limb muscles will work harder so the heavy workload can give impact on the leg muscles (Wakhid, 2016). Meanwhile the burpee workout, most of the fatigue will be felt at the time of the transition from the push up position to stands (Siska and Brodani, 2017). While on practice jump tuck, this exercise requires maximum effort. If the intensity of the workout is overload, it will happen to lack the correct technique that is not going to be accepted and performed by the samples (Stroube et al, 2013).

Therefore, this reseach aims to analyse and develop previous research so it will be obtained better results.

## 2. Research Methodology (Metode Penelitian)

This is a quantitative approach research with quasi experimental design. This research used Non-Randomized Control Group Pretest-Posttest. The samples were determined using purposive sampling technique. 52 students were obtain from 60 male student of SMP Negeri 2 Krian whom met the following criteria which was the member of extracurricular

The research samples were divided into four groups: 1. box jump exercises, 2. burpee . 3 tuck jump, and the last group is for control that was not given any treatment.

The combination of strength and speed training become power exercise, if it was performed in a mild to moderate intensity with a fast rhythm. This study applied a low to moderate intensity to each sample (30%-50% maximum repetition).

Data was analyzed using paired t test and MANOVA test with  $\alpha= 0,05$ . Before conducting manova test, normality and homogeneity test should be done. Normality test was performed by Kolmogorov Smirnov, meanwhile the homogeneity test performed by levene's test.

## 3. Result (Hasil)

### 3.1 Normality Test

Test of normality can be tested using the Kolmogorov-Smirnov test. To make it more clear, it will be elaborated below:

**Table 1. Normality test**

Variable	Step	Box Jump	Burpee	Tuck Jump	Control
Power Of leg muscle	PreTest	0.699	0.995	0.680	0.847
	PostTest	0.945	0.950	0.791	0.815
Speed	PreTest	0.748	0.970	0.852	0.906
	PostTest	0.896	0.978	0.909	0.910

Based on the table 1, the data is bound to have a normal distribution. It is known (P value) of any larger group which makes 0.05.

### 3.2 Homogeneity Test

There are two variables that do its homogeneity test which are limb muscle power and speed.

**Table 2. Homogeneity Test**

Variable	Sig.	Description
Power Of leg muscle	Pretest	0.333
	Posttest	0.193
Speed	Pretest	0.671
	Posttest	0.141

Known from the table 2, all data has significant value greater than 0.05. Therefore it can be concuded that the data is homogen

### 3.3 T Test

T-test was used to test a sample of bound variables of different pairs.

**Table 3. T Test for Power Of leg muscle**

	T	Sig.
Pair 1 <i>pretest</i> <i>posttest</i>	-3.649	.003
Pair 2 <i>pretest</i> <i>posttest</i>	-6.215	.000
Pair 3 <i>pretest</i> <i>posttest</i>	-6.602	.000

<b>Pair 4</b>	<i>pretest</i> <i>posttest</i>	-4.603	.001
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**Table 4. T Test for Speed**

		<b>T</b>	<b>Sig.</b>
<b>Pair 1</b>	<i>pretest</i> <i>posttest</i>	-9.692	.000
<b>Pair 2</b>	<i>pretest</i> <i>posttest</i>	-3.190	.008
<b>Pair 3</b>	<i>pretest</i> <i>posttest</i>	-9.431	.000
<b>Pair 4</b>	<i>pretest</i> <i>posttest</i>	-13.252	.000

Based on table 3 and 4, it can be seen a significant level of each variable is less than 0.05, therefore there are significant effects of each variable (the power and the speed of limb muscles) both from the group box jump, tuck jump burpee, group and the control group. Can be drawn the conclusion that there is a difference after the given box jump exercises, burpee and tuck jump.

### 3.4 MANOVA Test

To show the different variable between groups, data from all groups are tested simultaneously using the multivariate test test (MANOVA). To make it more clear, it will be elaborated below:

**Table 5. MANOVA test**

<b>Effect</b>		<b>Sig.</b>
<b>Intercept</b>	Wilks' Lambda	.000
<b>Group</b>	Wilks' Lambda	.030

Table 5 shows that there is a difference in improvement of limb muscles power and speed on the four groups are examined ( $\alpha < 0.05$ )

These three exercises (box jump, burpee, and tuck jump) show significant effect to the power and speed of the limb muscles. The purpose of these exercises is to increase the power and speed of the limb muscles. Some researches also reveal the same thing, as Pericles (2016) stated that the box jump exercise gives significant effect to increase power and speed of the limb muscles. Baro and Sonowal (2014) also argued that the practice of plyometric like dept. jump, jump up and box jump march done for six weeks can increase explosive strength, speed and agility.

Of these three exercises conducted every equation has a sample of the research required to jump on an

ongoing basis in accordance with a predetermined reps. This is resulted in the limb muscles contracting steadily – while continuously phase concentric or eccentric. It is in line with the principles of the plyometric like stretch shortening cycle (SSC), in which the motion of the eccentric takes place quickly followed a brief transition phase followed by an explosive concentric movement so it can gain maximum strength in a short time.

The frequency of exercises conducted by researchers within six weeks as much as three times a week is also one of the supporting factors of the three exercises to increase the power and speed of the limb muscles. There is some research which stated the same things among others: Jatrzebski et al (2014) concluded that plyometric exercises are applied for six weeks on volleyball players can improve explosive power. Kumar (2014) also concluded that plyometric exercises give significant effect on explosive power within six weeks on college-level soccer players.

From the results of paired sample t-test on the group exercise and burpee box jump, tuck jump effect on increasing the power and speed of the limb muscles. These results provide evidence that these three exercises can increase the power and speed of limb muscles of class VIII male students of junior SMP Negeri 2 Krian.

## 4. Conclusion and Recommendation (Simpulan dan Rekomendasi)

According to research data that has been spelled out in the previous chapter, it can be inferred that there is a difference between exercises significant influence, burpee box jump and tuck jump to increase power and speed of the limb muscles. Box jump exercises provides more optimal influence than other groups.

For teachers or coaches or extracurricular activities, exercises and burpee box jump, tuck jump can be used as a reference and applied to increase power on the limb muscles and speed of students.

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