

# Budi

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**Submission date:** 31-Dec-2023 04:14AM (UTC-0500)

**Submission ID:** 2265788019

**File name:** article\_budi.docx (253.11K)

**Word count:** 3344

**Character count:** 17689

## THE EFFECT OF KNEE LIFT JUMP EXERCISES ON INCREASING LEG MUSCLE EXPLOSIVE POWER IN BEGINNERS

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### Abstract

This research aims to assess the impact of knee lift jump training on increasing leg muscle explosive power in novice gymnasts at the Pengda Persani Palembang club. The study involved 30 gymnasts from the research population, with the same sample size. In this study, an experimental research method was employed involving data collection through sports tests and measurements. The research utilized a pre-test and post-test one-group design, with the pre-test conducted before applying the treatment and the post-test conducted afterward. The study aimed to evaluate the impact of knee lift jump exercises on improving lower limb muscle explosive power among members of the Pengda Persani Palembang gymnastics club. Based on research data obtained from vertical jump tests conducted on 30 novice gymnasts in the Pengda Persani Palembang club, the following key findings were observed: - Pre-test Mean: 51.63, Standard Deviation: 16.059, Range: 50, Normality test result: 0.087 - Post-test Mean: 59.13, Standard Deviation: 15.690, Range: 54, Normality test result: 0.109 The t-test resulted in a p-value of 0.000.

**Keywords:** Knee Lift Jumps; Explosive Power; Lower Limb Muscles; Gymnastics.


Submitted : 15<sup>th</sup> of October 2023

Accepted : 24<sup>th</sup> of December 2023

Published : 31<sup>th</sup> of December 2023

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DOI  <http://dx.doi.org/10.31851/hon.v7i1.13584>



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### INTRODUCTION

Floor gymnastics is one part of artistic gymnastics. It is said to be floor exercise because all movement skills are carried out on a mat-covered floor without involving other equipment (Amali, 2017). Floor gymnastics is also a sport in the South Sumatra provincial government. This can be seen from the South Sumatra KONI (Indonesian National Sports Committee) program, to improve from 19th place at the 2019 POPNAS XV (National Student Sports Week) in Jakarta, so that it will be even better at the 2023 POPNAS XVI in South Sumatra. Floor gymnastics is also a sport that is superior, therefore gymnastics is required to excel at regional,

national and international levels. Therefore, training needs to be carried out from an early age.

Coaching and the advancement of the sport itself are two components that help athletes achieve to their best potential (Irmansyah, 2017). Achievement in a sport is basically an interrelation of many interrelated factors and each of them contributes its role to the achievement of that achievement. These factors include the athlete's own factors, in factors related to athletes there are various qualities that athletes should have, starting from physical factors, motor factors, mental and emotional factors, and no less important anthropometric factors. All of these factors, in turn, become the most important determining factors when measuring the success of an athlete's development.

Development of sports achievements at an early age can be carried out systematically through sports education in schools in coordination with the parent organization of each sport branch (Ganang Rahmat Trisnawan, 2018). Floor exercise training should be carried out from an early age, this age is believed to be the ideal age to start gymnastics training which places a lot of emphasis on the element of strength. In gymnastics at an early age, it is included in the beginner category, namely ages 7 to 16 years. For beginner gymnasts, the development of movements is very important to monitor, because the child's body is still very flexible to be trained so that he can solve basic movements and advanced movements with the correct technique and there is still the possibility of changes in the structure of muscle fibers in his body as a result of training.

According to (Prastyo, 2015) movements in floor exercise require courage, body flexibility and correct technique, there are many types of floor exercise movements that have a high level of difficulty. From several basic floor exercise movements, The investigators are eager to investigate the leg muscles' potential, the main problem lies in the strength of the leg and thigh muscles, which is commonly known as explosive power. This explosive power really determines the perfection of the movement. Because, even though you can do gymnastic movements, The outcomes won't be ideal if your leg muscles lack explosive force.

A set of leg muscles called leg muscle rapidly strength are used to propel oneself forward explosively during jumping (Isabella & Bakti, 2021). Explosive power has a role in improving floor exercise performance, therefore explosive power must be trained, since the leg muscles' capacity for prolonged, successive contractions is known as its explosive power (Arisman & Agun Guntara, 2021). The capacity of muscles to produce tension in the face of opposition is known as strength

Success in the training process really depends on the quality of the training which is a supporting factor for achieving high sporting achievements (Wati et al., 2018). For this reason, Research on enhancing the leg muscles' strength and explosiveness is essential, so that novice gymnasts can perform movements with the correct technique. According to researchers, the knee lift leap is the ideal workout to improve the leg muscles' explosive strength. According to (Purnomo et al., 2015) A training technique which could be utilized to increase athletes' biomotor fitness is knee lift jump training, including strength and speed which has very wide applications in sports activities, and in particular this exercise is very useful for increasing power. explode.

According to (Brier & Lia Dwi Jayanti, 2020) This type of knee lift jump workout is done on a level area like a mat, floor, or grass. One type of exercise that aims to increase strength is plyometric training. Because in plyometric training, movements are carried out at a certain movement speed which involves a tense reflex, where the muscle is ready to contract again before it is in a relaxed state.

Based on observations at Gor Ranau Conocohphilip, many beginner gymnasts still lack explosive power abilities in performing movements during jumping and landing positions. This is still an important homework assignment for coaches. So this research needs to be carried out in order to improve the beginner gymnasts at Pengda Persani Palembang club's explosiveness abilities. Therefore, this research must be done with the aim to improve novice athletes' leg muscles' strength and speed at the Pengda Persani Palembang club. The research study entitled " The Pengda Persani Palembang club's rookie gymnasts' increased leg

muscular explosive strength as a result of knee lift jump training". It is intended that this research will then help gymnastics instructors decide on the best coaching regimen to help athletes succeed. Therefore, this research must be carried out.

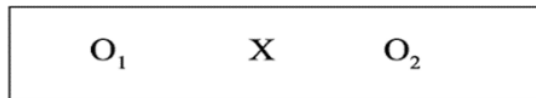
## METHOD

This study employed an experimental design with methods for gathering data through sports testing and measurement (Mickey Anggara Suganda, 2017). A single group pre- and post-testing was employed in the study. Before starting therapy, a pre-test was used in this design. This makes it possible to determine the treatment's outcomes with more accuracy (Putra et al., 2020). since it is contrasted with the circumstances prior to taking care of treatment. The researcher here aims to find out whether there is an influence between the independent variable and the dependent variable. The variables in this study consisted of the knee lift jump exercise (Independent Variable) while the ability to boost the leg muscles' capacity for explosive action (dependent variable).

**Table 1.** One Group Pre-Test and Post-Test Design Scheme

Pre Test	Treatment	Post Test
T1	X	T2

In the research, researchers used a one group pre-test and post-test research design. Two sets of observations are made in this design: one before the experiment and one after. Pre-test observations are those made prior to the experiment (O1), and post-test observations are those made following the experiment (O2) (Mickey Anggara Suganda, 2017). In this study, the aim was to determine the impact of knee lift jump training at Pengda Persani Palembang club on enhancing leg muscle strength and explosiveness.



**Figure 1.** Research design

The digital vertical jump test and the knee lift jump test were the devices employed in this study. The data collection technique used in this research is based on research on the results of measurement tests taken during the pretest and post-

test, in this case the researcher does not carry out the activities himself, the research subject remains to collect data, process data and draw conclusions by adapting to existing research norms. is available with reliability and validation standards. Using SPSS, the researchers' method of data analysis involves performing hypothesis and normality tests.

## RESULTS AND DISCUSSION

Based on research data through vertical jumps carried out by novice gymnasts at the Pengda Persani Club in Palembang City with a sample of 30 people. For the pre-test results, the average (mean) was 51.63, the standard deviation was 16.059, the largest data was 77 and the smallest data was 27 and the range was 50. The post-test results obtained an average (mean) of 59.13, the standard deviation is 15.690, the largest data is 86 and the smallest data is 32 and the range is 54. The results of the pre-test normality test are 0.087 and post-test 0.109, the t test data is 0.000.

Considering the outcomes of the leg muscle explosive power pre-test carried out by novice gymnasts at the Pengda Persani Palembang club with a sample of 30 people, the mean was 51.63, the standard deviation was 16.059, the largest data was 77 and the smallest data was 27 and the range is 50. For more details, see the table below.

**Table 2.** Description of Pre-test Results Data for Explosive Power of Leg Muscles

	N	Range	Maximum	Minimum	Mean	Std. deviation
Pre-test	30	50	77	27	51.63	16,059

Considering the outcomes of the leg muscle explosive power post-test carried out by beginner gymnasts at the Pengda Persani Club, Palembang City with a sample of 30 people, the average (mean) was 59.13, the standard deviation was 15.690, the largest data was 86 and The smallest data is 32 and the range data is 54. For more details in table 3.

**Table 3.** Distribution of Post-Test Results Data

	N	Range	Maximum	Minimum	Mean	Std. deviation
Posttest	30	54	86	32	59.13	15,690

This research was carried out on all increases in leg muscle explosive power carried out by 30 novice gymnasts at the Pengda Persani Club in Palembang City.

Following the first test, they received treatment for six weeks at three times a week in the form of knee lift jump exercise and an intensity of 70%-90%. The results of the initial test (pre-test) are known to show that the average (mean) is 51.63, the standard deviation is 16.059, the largest data is 77 and the smallest data is 27 and the range is 50. It appears that improving the leg muscles' explosive strength has an impact on the post-test results showed that the average (mean) was 59.13, the standard deviation was 15.690, the largest data was 86 and the smallest data was 32 and the range was 54. So there was an increase in the average of 7.5. For more details, see the table below.

**Table 4.** Comparison List of Pre-test and Post-test Results

	N	Maximum	Minimum	Mean	Mean Increase pre-test and post-test
Pre-test	30	77	27	51.63	7.50
Post-test	30	86	32	59.13	

This research used the Kolmogorov-Smimova normality test with the spss 22 program. The normality test was carried out on each pre-test and post-test research data. When a significant value is greater than 0.05, the data is considered regularly distributed. Meanwhile, the data has a non-normal distribution if it is significant < (0.05).

**Table 5.** Normality Test Results

	Kolmogorov-smimova		
	statistics	df	Sig.
Pre-test	0.149	30	0.087
Post-test	0.145	30	0.109

Based on this table, All of the pre- and post-test data show significant values larger than 0.05 (> 0.05), as can be seen. These findings demonstrate the normal distribution of the data. This study used data analysis to test the effect of knee lift jump training on increasing leg muscle explosive power in novice gymnasts at the Pengda Persani Palembang club. The t test was employed in this study's data analysis. If the significance value is  $p < (0.05)$ , the study hypothesis is deemed accepted. Meanwhile, the hypothesis is rejected if the significance value,  $p > (0.05)$ .

For the results of the Pre-test and Post-test Vertical Jump Digital, the t test on the experiment was used to test the hypothesis which states that "There is an

3 | effect of Knee Lift Jump training on increasing leg muscle explosive power at the Pengda Persani Palembang Club". The following are the results of the pretest and posttest t test for the experimental group:

**Table 6.** Pretest and Posttest T Test Results for the Experimental Group.

Pair	Pretest – posttest	t	df	Sig.(2-tailed)
		15,432	29	0,000

based on the t test results' output table. The 2-tailed sig value that was achieved was 0.000. It indicates a significant shift between the first and final test results, as it is less than 0.05. Thus, it can be said that the knee lift jump exercise increases the leg muscles' explosive power.

### Discussion

Discussion of the research findings is required in accordance with the research criteria. Pre- and post-test data, as well as data on the impact of knee lift jump training on enhancing the explosive power of leg muscles in beginning gymnasts at the Pengda Persani Club in Palembang, will all be covered: Three training sessions each week were conducted for the duration of this study, which lasted six weeks. This is consistent with Harsono's (2017:14) assessment of technical proficiency following six weeks of training, which states that the goal is for the central nervous system (CNS) to regenerate physiologically and psychologically prior to the commencement of the training season the following year. According to (Abrasyi & Hernawan, 2018) the main aim of this training is to improve athlete performance. This process involves repeated repetitions and gradual increases in load. The explosive power of the leg muscles can influence movements with a more difficult level of difficulty. The explosive power of the leg muscles can be trained with various forms of exercise, one of which is the knee lift jump exercise. Therefore, knee lift jump training is needed, which is a group of leg muscles that are used to make explosive movements when jumping (Isabella & Bakti, 2021).

The knee lift jump technique, the knee lift jump exercise is an exercise that jumps forward or upwards once sequentially and repeatedly which is useful for increasing the explosive power of the leg muscles according to (Enoksen et al.,



2022). Most beginner gymnasts need explosive power to achieve certain movement goals, therefore, good knee lift jump skills are needed. So that in its implementation it can help the athlete's abilities, in this case training is needed to increase the explosive power of the leg muscles. This training is a way for athletes to get better performance, athletes are prepared to be able to achieve predetermined goals through a series of focused exercises according to (Amansyah, 2019). The purpose of this intensive training is to increase the athlete's abilities and capacity so that they achieve maximum performance. There are many exercises to increase explosive power abilities, one of which is the knee lift jump exercise. The knee lift jump training method is to do an upward jumping movement. One thing you need to pay attention to when doing this knee lift jump is the positioning of the movement.

Based on data analysis of research results, it was found that there was a significant influence on the conscientious group. Giving treatment (Threatment) for 6 weeks with 3 times a week of training had an effect on increasing the explosive power of the leg muscles of novice gymnasts at the Perda Persani Club in Palembang City. Based on the results of research conducted with a pre-test of 77 and a post-test of 86. From this data there was an increase after being given treatment of 7.50. After seeing whether there was an improvement or not after being given treatment, this research was then tested again to prove whether the hypothesis which stated that there was an effect of knee lift jump training was accepted or rejected. This can be proven by the results of the pre-test - post-test t test in the experimental group. The criteria for hypothesis testing in this research are that the research hypothesis is declared accepted if the significance value is  $<0.05$ , while if the significance value is  $>0.05$  then the hypothesis is rejected.

From the test results carried out with unit t, a significant value of 0.000 was obtained. Therefore, the significant value is smaller than 0.05 ( $0.000 < 0.05$ ) and has a mean comparison between the pre-test and post-test which has increased by 7.50. So these results show that the knee lift jump exercise has an effect on increasing the explosive power of the leg muscles at the Pengda Persani Palembang club.

Reviewing the results of the data analysis above shows that there is a significant influence between the pre-test and post-test results. Providing knee lift jump training has an effect on increasing the explosive power of the leg muscles. It can be concluded that there is an influence of knee lift jump training on increasing the explosive power of the leg muscles in the Pengda Pesani Palembang club.

### CONCLUSION

Based on the results of research and data analysis, the initial test results (pre-test) were 51.63 and the final test results (post-test) were 59.13, and experienced an increase of 7.50. So it can be concluded that the knee lift jump exercise has an effect on increasing the explosive power of the leg muscles at the Palembang sports club. The results of this research show that the knee lift jump exercise can be used as a training method to increase maximum leg muscle performance in floor exercise.

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