



## **Barrier Jump Training to Leg Muscle Explosive Power**

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### **Abstract**

The objective of this research is to determine the impact or effect resulting from the provision of barrier jump training on the explosive power of leg muscles of male volleyball extracurricular participants at Junior high school Sila Candra Batubulan. This research is an experimental research with experimental research design randomized pre and post group design. This research was conducted for 6 weeks with a frequency of 4 times a week. The number of samples in this study were 30 people who were divided into 2 groups. Based on the above discussion, it can be concluded that barrier jump training increases the explosive power of the leg muscles of male volleyball extracurricular participants at Junior high school Sila Candra Batubulan with an average increase of 8.69 cm (20.69%) with a p value <0.05.

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## INTRODUCTION

Sport is a systematic process in the form of all activities or efforts that can encourage developing and fostering one's physical and spiritual potentials (Santika, 2015). Exercise is done with the intention of maintaining health and strengthening the muscles of the body. In its development, this activity can be carried out as an entertaining and fun activity. Santika (2015) said the quality of one's health is important to be maintained for human survival. Exercise is an absolute requirement so that we stay in good health. Even though we know that our sports are done deliberately and unintentionally.

Sports activities are also carried out with the aim of increasing achievement. Effendi (2016) said that achievement is one of the factors in the success of sports development. Sports achievement is a priority in increasing the dignity of the nation in sports. We know that the reverberation of the National Anthem of Indonesia Raya is not arbitrary in friendly countries. One because of national visits and the other because our country has become a champion in sports championships. We as sportsmen should raise the dignity of the nation through maximum achievements. Whatever sport we are involved in, we must achieve maximum achievement.

Volleyball is one of the most accomplished sports in Indonesia. according to Fardiansah (2015) volleyball sport is a game that is included in the subject matter of physical education. Volleyball has a high existence, especially on the island of Bali. This can be seen from the number of events held from the village to district levels. Participants involved are usually from the youth organization or in Bali called the Sekaha Taruna Taruni (ST). With the stretching of the volleyball sport, the youth in the banjar have become intense to do sports.

Batubulan Village is a village located in Sukawati District, Gianyar Regency. The art village which has a high existence in the field of sports, especially volleyball, has made all cadets in Batubulan Village intensely engage in volleyball. Junior high school Sila Candra is one of the junior high schools located in Batubulan Village. The school which is owned by this village is a school that has a high existence in the fields of sports and arts. With the existence of the volleyball sport in Batubulan Village, the male students at Junior high school Sila Candra meet the volleyball extracurricular quota.

Based on the observations conducted at Junior high school Sila Candra Batubulan, especially the observation of the physical abilities of

the volleyball extracurricular participants, in this case the limb muscle explosive power was still in the low category (Tirtayasa, 2018). This is very concerning, considering that SMP Sila Candra always contributes achievements in inter-school competitions in Sukawati District. This is a priority for researchers to increase the explosive power of the leg muscles of the students. according to Adiatmika & Santika, (2016) muscle explosive power is the ability to perform activities suddenly and quickly by exerting all the strength in a short time. according to Dewi, Sudiana, & Arsani (2018) states that the explosive power is the result of the combination of strength and speed.

Many trainings have been applied by other researchers in increasing the explosive power of leg muscles such as : Wahyu (2015) doing Squat Jump training to increase leg muscle explosive power, Pelamonia & Harmono (2018) doing 90 Degree Ledder Drill training in increasing leg muscle explosive power, Suantika, Sumerta & Santika (2016) doing Double Leg Bound in increasing leg muscle strength, Gunawan, Dewi & Santika (2016) doing training jumping over obstacles as high as 50 cm in increasing the explosive power of the leg muscles, Wibawa, Santika & Sudiarta (2017) doing Knee Tuck Jump training in increasing leg muscle explosive power.

Of the many studies that explain the increase in the explosive power of leg muscles, we as researchers made a breakthrough by conducting Barrier Jump training in increasing the explosive power of leg muscles of male students of Junior high school Sila Candra Batubulan. according to Donald (1992) Barrier Jump is a training that is carried out with obstacles with a height between (30-90 cm).



**Figure 1.** Barrier Jump Training 10 reps 3 sets (Tirtayasa, 2018)

Based on the above review, the problem formulation in this study is whether Barrier Jump training has an influence on the explosive power of leg muscles of male students who are extracurricular volleyball participants at Junior high school Sila Candra Batubulan? With the formulation of the problem above, the objective to be

achieved in this study is to determine the impact or effect resulting from the provision of barrier jump training on the explosive power of leg muscles of male volleyball extracurricular participants at Junior high school Sila Candra Batubulan. The researcher hypothesized that barrier jump training could increase the explosive power of the leg muscles of male students who were extracurricular volleyball participants at SMP Sila Candra Batubulan.

## METHODS

This research is an experimental research with experimental research design randomize pre and post group design (Sugiyono, 2003). This research was conducted in Batubulan Public Field. The length of this research was 6 weeks with a frequency of 4 training times per week, namely Monday, Wednesday, Friday and Saturday. The population in this study were male students participating in extra-curricular volleyball, amounting to 40 students. Of the 40 people the population is selected using the Pocock formula (Pocock, 2008) obtained a sample of 13 people per group. To anticipate the drop out of the sample, 2 backup samples are added so that it becomes 15 people per group. Considering that this research is experimental, there are two groups in this study, namely the treatment group (Barrier Jump Training) and the Control group (Knee Tuck Jump Training). So that the total sample in this study is 30 people including the reserve sample.

The data analysis method in this study consisted of: 1) statistical descriptive test to analyze the mean, SB, minimum and maximum explosive power of the leg muscles, 2) data normality test with the Shapiro Wilk Test which aims to determine the normality of the leg muscle explosive power data of each group. treatment and control, 3) the homogeneity test with the Levene's Test aims to determine the homogeneity of the leg muscle explosive power measurement data in each group, 4) the t-paired test is used to analyze the mean changes in the results of the measurement of the limb muscle explosive power between before and after training. in each group and 5) the T-Independent Test was used to analyze the mean changes in leg muscle explosive power between treatment and control groups before and after training.

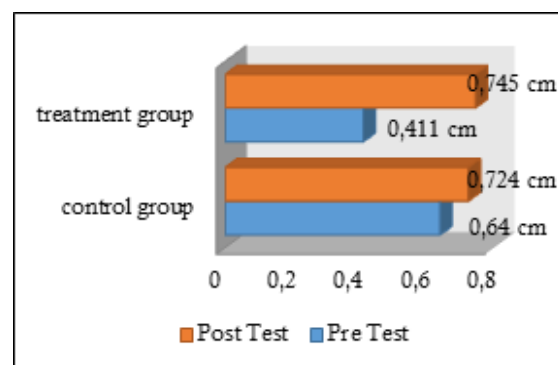
## RESULTS AND DISCUSSION

Based on the normality and homogeneity test, the data from each group for pre and post ob-

tained a p value greater than 0.05 ( $p > 0.05$ ). This shows that the data is normally distributed and homogeneous so that it can be continued to the next stage with a parametric test. The following **Table 1** is related to the normality and homogeneity test data.

**Table 1.** Explosive Power Data Normality and Homogeneity Test Data Foot Muscles of Male Volleyball Extracurricular Participants Junior high school Sila Candra Batubulan

Measure- ment Limb Muscles Explosive Power	Normality test (Saphiro Wilk-Test)		Homoge- neity Test (Levene- Test) p value
	Control group p value	Treat- ment group p value	
Pre test	0,640	0,411	0,873
Post test	0,724	0,745	0,771



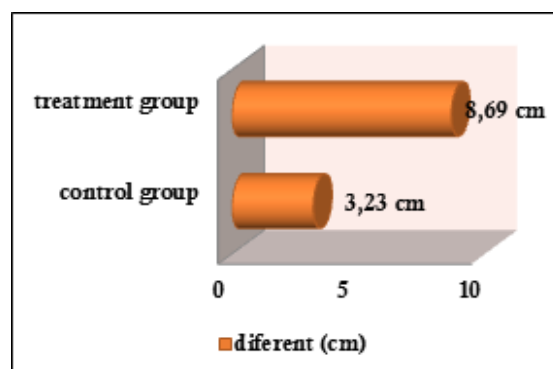
**Figure 1.** Results of Normality and Homogeneity of Limb Muscle Explosive Power Levels Male students participating in volleyball extracurricular activities at Junior high school Sila Candra Batubulan

The next step is to do an independent paired t-test to determine the changes in the effects of the treatment group and the control group. So that with the paired independent t-test, we will find out how much influence the training we provide on the power of leg muscles of male volleyball extracurricular participants at Junior high school Sila Candra Batubulan. Based on the independent t-paired test, the mean value of the initial test for the control group was  $40.69 \pm 6.499$  cm and the mean value for the final test for the control group was  $43.92 \pm 6.291$  cm with a mean difference of 3.23 cm and a p-value less than 0.05 ( $p < 0.05$ ). This means that there is a significant difference in training in the control group. While the independent t-paired test in the treatment group obtained the initial test mean value of  $42.00 \pm 6.110$  cm and the final test mean value of  $50.69 \pm 6.836$  cm with a mean difference of

8.69 cm and p value less than 0.05 ( $p < 0.05$ ). This means that there is a significant difference in the training of the treatment group.

**Table 2.** Independent t-paired test for the treatment group and control group to Know the Effect of Training on Each Group

Limb Muscle Explosive Force Measurement	Min.	Max.	Mean	SB	difference	t	p
Control Group							
Pre Test (cm)	30	51	40,69	6,499			
Post Test (cm)	32	54	43,92	6,291	3,23	11,502	0,000
Treatment Group							
Pre Test (cm)	30	51	42,00	6,110			
Post Test (cm)	38	62	50,69	6,836	8,69	17,003	0,000



**Figure 2.** Training Effect Difference Graph (Training Impact) In the Treatment Group and Control Group

Based on **Figure 2**, it can be seen that the treatment group gave a training impact of 8.69 cm, while the control group had a training impact of 3.23 cm. The two groups both had an impact on increasing the explosive power of the leg muscles of male students participating in volleyball extracurricular activities at Junior high school Sila Candra Batubulan. But the training impact was greater in the treatment group, namely barrier jump training.

**Table 3.** Independent t-test to determine the effect of training between treatment groups and control groups

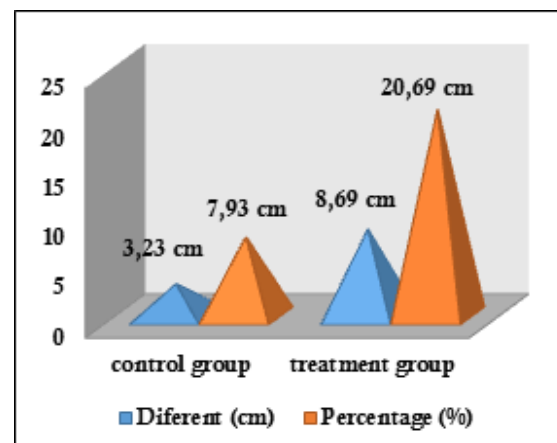
	Group	Mean	t	p	Mean Different
Post-test	Control	43,92±6,291	2,627	0,602	6,77
	Treatment	50,69±6,836			

To determine the effect of training between treatment and control groups, an independent t-test was performed. Based on **Table 3**, the mean value in the control group post test is 43.92±6.291 cm and in the treatment group 50.69±6.836 cm. Through the independent t-test, it was found that

the p value was greater than 0.05 ( $p > 0.05$ ). This means that there is a significant difference between the final result (post test) in the control and treatment groups.

**Table 4.** Percentage Increase in Limb Muscle Explosive Power In the Control and Treatment Group

Analysis Results	Control Group	Treatment Group
Pre Test Limb Muscles Explosive Power (cm)	40,69	42,00
Post Test Limb Muscles Explosive Power (cm)	43,92	50,69
Diferent of Limb Muscles Explosive Power (cm)	3,23	8,69
Percentage (%)	7,93	20,69



**Figure 3.** Percentage Increase in Limb Muscles Explosive Power In the Control and Treatment Group

Barrier Jump training 10 reps 3 sets is a training that is carried out by jumping 3 wooden hurdles with the first goal height 30 cm, the second goal 50 cm and the third goal 100 cm. The sample starts the jump from the starting point by performing a jump using both legs simultaneously. During the jump, the two sample arms swing to maintain their balance. The jump is done in a dose of 10 reps 3 sets with a rest period between sets of 30 seconds.

If we relate Barrier Jump training 10 reps 3 sets with previous training which is the same type of training as Barrier Jump training as high as 40 cm 10 reps 4 sets (Widiantari & Mertayasa, 2018), then you can see Barrier Jump training 10 reps 3 sets with a combination of high goal different can increase the explosive power of the leg muscles better than Barrier Jump training with the same goal height.

Based on **Figure 3** above, it is very clear that the treatment group has a better training impact than the control group in increasing the ex-

plosive power of leg muscles of male volleyball extracurricular participants at Junior high school Sila Candra Batubulan. This is consistent with training Widiyanti & Mertayasa (2018) that barrier jump training increases the leg muscle explosive power.

## CONCLUSION

Based on the above discussion, it can be concluded that barrier jump training increases the explosive power of the leg muscles of male volleyball extracurricular participants at Junior high school Sila Candra Batubulan. Thus the alternative hypothesis which says barrier jump training increases the explosive power of the leg muscles of male students participating in volleyball extracurricular activities at Junior high school Sila Candra Batubulan is accepted. Our advice to trainers is to be able to use barrier jump training to increase leg muscle explosive power. Researchers engaged in sports coaching should be able to use this research as a reference so that it can be further developed for the development of the world of education and coaching.

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