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The Effect of Jump Sprint and Box Jump Training on Leg Muscle Power in Volleyball in Junior High School Students

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Abstract

This study aims to analyze the effect of Jump Sprint and Box Jump training on leg muscle power in volleyball games in State Junior High School students in Tegallalang District. This study uses a quantitative approach with a quasi-experimental method through a pretest-posttest control group design. The research sample consisted of three groups, namely the Jump Sprint training group, the Box Jump training group, and the control group selected using purposive sampling techniques. The research data was obtained through leg muscle power tests before and after treatment. Data analysis was carried out using the Wilcoxon Signed-Ranks, Mann-Whitney U, and moderation analysis based on Body Mass Index (BMI). The results showed that Jump Sprint training had a significant effect on increasing students' leg muscle power ($Z = -6.190$; $p < 0.001$). Box Jump training has also been shown to have a significant effect on increasing leg muscle power ($Z = -5.755$; $p < 0.001$). In addition, there was a significant difference in effectiveness between the two training methods, where Jump Sprint training was more effective than Box Jump in increasing students' leg muscle power ($Z = -5.979$; $p < 0.001$). The results of the study also showed that Body Mass Index (BMI) played a role as a moderator variable that affected the effectiveness of training. The advantages of the Jump Sprint method are more optimal in students with the ideal BMI category, while in students with the overweight to obese category, the effectiveness of both methods tends to be homogeneous.

Keywords: BMI, Box Jump, Jump Sprint, Leg Muscle Power, Volleyball.

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INTRODUCTION

Sports are an integral part of the national education system which has a strategic role in the formation of students' character, physical and mental health (Pradana, 2021). In the context of education in junior high school (SMP). SMP Negeri 2 and SMP Negeri 4 Tegallalang have shown a strong commitment to the development of volleyball achievements. However, initial observations on May 19, 2025 and May 20, 2025 by conducting interviews with Physical Education, Sports, and Health (PJOK) teachers in both schools showed that the physical training programs implemented in the two schools were still conventional and did not integrate many modern training methods based on *evidence-based practice*. Most of the training activities still focus on techniques and tactics, while aspects of the development of biomotor components, particularly leg muscle power, have not received optimal attention. This condition creates a gap between the potential possessed and the training methods applied, Sports activities not only function as a means of recreation, but also as a medium for developing students' physical, psychological, and social potential. Volleyball, as one of the popular team sports among junior high school students, has been shown to make a significant contribution in developing various aspects of physical abilities such as coordination, balance, agility, and especially leg muscle power (Munir et al., 2024).

Volleyball has unique game characteristics with dynamic movements that demand optimal physical ability (Sahabuddin et al., 2022). Techniques in volleyball such as *spike, block, jump serve*, and *quick attack* Requires *explosive* high power of the leg muscles. This makes leg muscle power a biomotor component that is very fundamental in determining the quality of performance of volleyball players. Therefore, the systematic development of leg muscle power is a crucial aspect that must be considered in volleyball training programs at the school level.

The power of the leg muscles is the biomechanical foundation that determines the effectiveness and efficiency of movement in the game of volleyball (Fachrudin & Sistiasih, 2023). Physiologically, the muscles of the legs are composed of *quadriceps femoris, hamstring, gastrocnemius,* and *gluteus maximus* Acting as a *prime mover* in generating the vertical force needed to perform high jumps. Biomechanical research shows that the ability to *vertical jump* The optimal is highly dependent on the strength and power of the leg muscles, where a 10% increase in leg muscle power can contribute to an increase in jump height of up to 15-20% (Utamayasa, 2020).

In volleyball games, the power of the leg muscles has an effect not only on the height of the jump, but also on the speed of movement, landing stability, and injury prevention (Setyawan et al., 2020). *Spike* Effective requires a combination of approach speed, timing take-off, and

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explosive power from the leg muscles. Similarly, the *blocking* that require the ability to *quick jump* and sustain power to maintain position in the air. The reality in the field shows that many junior high school students experience limitations in performing these techniques optimally due to inadequate leg muscle power.

One form of exercise, namely *plyometric* exercises that specifically emphasize the development of explosive strength of leg muscles, is *Jump Sprint* and *Box Jump*. These two types of exercises not only involve explosive jump elements, but also incorporate components of speed, coordination, and motion control that are very relevant in the game of volleyball. Jump *Sprint* training is a form of advanced *plyometric* training that combines explosive jump elements with sequential *sprint* acceleration in a dynamic sequence of movements. This exercise relies on two main components in the development of *explosive* power: the ability to generate vertical power through jumping, and the ability to transform that power horizontally in the form of a sprint. In the context of volleyball, *Jump Sprint* is particularly relevant because many of the movements in the game require a quick transition from static to active, such as when changing positions after *blocking*, defending, or heading towards *a spike* position.

Next Workout *Box Jump* is a form of training *pliometric* that are specifically aimed at improving *explosive vertical* Power (Fachrudin & Sistiasih, 2023). In this exercise, individuals jump from a stationary position onto a box or platform of a certain height, which is usually varied according to the level of ability and purpose of the exercise. This movement not only demands leg muscle power, but also coordination, balance, and *Timing* precise. *Box Jump* has been proven to be one of the most effective exercises in increasing vertical jump height (*vertical jump height*), which is a key component in volleyball games such as *spike* and *blocking*. These targets create psychological and biomechanical challenges, which encourage muscles to work harder and more explosively. According to Irsyada (2025) Training *Box Jump* has a significant influence on increasing the jump height of female volleyball athletes because they train *explosive* power directly through a vertical jump pattern against a fixed target.

An exercise program that combines *Jump Sprint* and *Box Jump* creates a strong synergy between the development of explosive strength and accelerated speed in the leg muscles. Jump *Sprint training* focuses on increasing *the rate of force development (RFD),* which is the ability of muscles to generate maximum force in a very short period of time, which is important in quick movement transitions when playing volleyball. Meanwhile, *the Box Jump* exercise emphasizes strengthening *concentric jump mechanics*, where the muscles produce force efficiently during the upward thrust phase, while also training motor control and coordination of the main muscles of

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the legs such as *the quadriceps*, *gluteus maximus*, and *hamstrings*. The combination of the two provides a balanced training stimulus between speed and power, two much-needed components in the modern game of volleyball. Therefore, the integration of *Jump Sprint* and *Box Jump* in junior high school students' training programs is highly recommended to support the development of optimal motor performance in the context of volleyball games. Based on these problems, this study aims to comprehensively examine the effect of *Jump Sprint* and *Box Jump exercises* on increasing leg muscle power in junior high school students who actively play volleyball.

RESEARCH METHODS

This research is included in the type of experimental quantitative research. The method used is a *quasi-experimental* method with *a pretest-posttest control group design*. The research sample consisted of three groups, namely two treatment groups and one control group, which were taken from grade VIII students of State Junior High School in Tegallalang District. The type of data used in this study is quantitative data. Quantitative data is obtained in the form of numbers that can be analyzed statistically to see the influence between variables. In this study, the quantitative data collected included the results of the students' leg muscle power tests before (*pre-test*) and after (*post-test*) were given physical exercise treatment according to their respective groups (*Jump Sprint*, *Box Jump*, and control group).

The population in this study is all grade VIII students in Junior High School (SMP) located in Tegallalang District, Gianyar Regency, Bali. The research sample was taken by the *purposive sampling* That is a sampling technique in research that is carried out deliberately, where the researcher chooses subjects based on certain criteria that are relevant to the research objectives (Campbell et al., 2020).

RESULTS AND DISCUSSION

Data Normality Test

The normality test aims to find out whether the distribution of leg muscle *power* data in each treatment sample group (*Jump Sprint*, *Box Jump*, and Control Group) is reviewed from the normally distributed Body Mass Index (BMI) category or not. This test is performed on the *residual values* of the variable model to test the feasibility of the error distribution.

The decision-making criteria in this descriptive data normality test are based on the v alue of the significance of the calculation $(P - value)$:

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- If the value is the $Sig. > 0{,}05$*residual power* of the leg muscles, it is declared to be normally distributed.
- If the value is the $Sig. < 0{,}05$ *residual power of* the leg muscles, it is stated that it is not normally distributed.

The normality test in this study was calculated using *the Kolmogorov-Smirnov* test instrument (with *Lilliefors* correction) and *the Shapiro-Wilk test* with the help of the SPSS computer program. A summary of the results of the data normality test for the residual power value of the leg muscles can be seen in the table below:

Table 1. Normality Test Results of Leg Muscle Residual Power Data Reviewed from the BMI Category with SPSS Program

Data	Groups	*Shapiro-Wilk*			
		Statistics	DF	Say.	Remarks
Pre-test	1. *Jump Sprint*	0,984	50	0,740	Normal
	2. *Box Jump*	0,970	50	0,221	Normal
	3. Control	0,986	50	0,831	Normal
Post-test	1. *Jump Sprint*	0,971	50	0,261	Normal
	2. *Box Jump*	0,986	50	0,832	Normal
	3. Control	0,987	50	0,870	Normal
Giant Score	1. *Jump Sprint*	0,627	50	< 0.001	Abnormal
	2. *Box Jump*	0,421	50	< 0.001	Abnormal
	. Control	0,966	50	0,157	Normal

Homogeneity Test

The homogeneity test was performed to test the assumption of similarity of variance from the error of the bound variable between treatment groups. This test uses *Levene's Test of Equality of Error Variances*. Considering that this study involves attribute variables in the form of Body Mass Index (BMI), homogeneity testing is carried out integrated with a factorial design structure. The test results are presented in the following table:

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Table 2. Results of the Variance Variance Gain Score Power Test of Leg Muscles (Levene's Test)

Bound Variables	Basis of Calculation (Based on)	Statistics Levene	df1	df2	Significance (Sig.)
Gain Power	*Based on Mean*	3,616	30	105	< 0.001
	Based on Median	0,937	30	105	0,566
	Based on Median with adjusted df	0,937	30	13,678	0,579
	Based on Trimmed Mean	2,626	30	105	< 0.001

Research Hypothesis Testing

Hypothesis testing was carried out to empirically test four research hypotheses that have been proposed. Given that the results of the data analysis prerequisite test in the previous sub-chapter showed that the data error variance was not homogeneous at the mean value (*Based on Mean* p < 0.001), the parametric statistical assumption was not met. Therefore, testing Hypotheses I, II, and III were completed using Non-Parametric Statistical instruments (Wilcoxon, Kruskal-Wallis, and Mann-Whitney U tests). Meanwhile, Hypothesis IV testing was approached macroally using *Tests of Between-Subjects Effects* (Factorial ANOVA) to see the value of global linear interactions, which were then micro-dissected using split-file non-parametric analysis to look at moderation behavior contextually.

Hypothesis Testing I

Table 3. Wilcoxon Signed-Ranks *Analysis Results* in the *Jump Sprint Group*

Categories Ranks	Data Conditions	N	Mean Rank	Sum of Ranks	Z Value Calculate	Asymp. Sig. (2-tailed)
Negative Ranks	Data *Post-test* < *Pre-test*	0	0,00	0,00	-6,190	< 0.001
Positive Ranks	Data *Post-test* > *Pre-test*	50	25,50	1275,00		
Ties	Data *Post-test* = *Pre-test*	0	-	-		
Total		50				

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The results of the inferential statistics show that the Z value is calculated as -6.190 with *the value of Asymp. Sig. (2-tailed)* < 0.001. Since the value of the significance of the calculation is less than a = (0.001 < 0.05), H0 is rejected and H1 is accepted. Thus, it can be concluded that there is a significant influence of *Jump Sprint training* on the leg muscle power of State Junior High School students in Tegallalang District. All subjects (50 students) experienced a trend of increasing the achievement of massive and even leg muscle explosiveness in all students.

Hypothesis Testing II

Table 4. Results of *Wilcoxon Signed-Ranks* Analysis in the *Box Jump Group*

Categories Ranks	Data Conditions	N	Mean Rank	Sum of Ranks	Z Value Calculate	Asymp. Sig. (2-tailed)
Negative Ranks	Data *Post-test* < *Pre-test*	1	50,00	50,00	-5,755	< 0.001
Positive Ranks	Data *Post-test* > *Pre-test*	49	25,00	1225,00		
Ties	Data *Post-test* = *Pre-test*	0	-	-		
Total		50				

Inferential statistical results show a calculated Z value of -5.755 with *an Asymp. Sig. (2-tailed)* value < 0.001. Since the value of the significance of the calculation is less than a = (0.001 < 0.05), H0 is rejected and Ha is accepted. Thus, it can be concluded that there is a significant influence of *Box Jump training* on the leg muscle strength of State Junior High School students in Tegallalang District. It was recorded that 49 students experienced an increase in the explosive power of the leg muscles after being given treatment.

Hypothesis Testing III

Table 5. Comparative Effectiveness Differences (*Mann-Whitney U Test*)

Training Groups	N	Mean Rank	Sum of Ranks	Mann-Whitney U Value	Z Value Calculate	Asymp. Sig. (2-tailed)
Jump Sprint	50	67,36	3368,00	407,000	-5,979	< 0.001
Box Jump	50	33,64	1682,00			

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Based on the above results, the statistical value *of Mann-Whitney U* was obtained of 407,000 and the value of the Z coefficient calculated was -5.979 with a significance level of *Asymp. Sig. (2-tailed)* < 0.001. The results of the calculation show that the calculated probability value is well below the set real error threshold (0.001 < 0.05), so H0 is rejected and Ha is accepted.

Thus, it can be empirically proven that there is a significant difference in effectiveness between *Jump Sprint* and *Box Jump training* on the leg muscle strength of State Junior High School students in Tegallalang District. To determine which methods have a higher effectiveness advantage, the analysis refers to the average rank parameter (*Mean Rank*). The *Jump Sprint* training group recorded *a Mean Rank* of 67.36 with a *Sum of Ranks* of 3368.00, while the *Box Jump* group only obtained a *Mean Rank* of 33.64 with *a Sum of Ranks* of 1682.00. Because the accumulated rating of *the Jump Sprint* group is twice as high as that of *the Box Jump* group, the *Jump Sprint* training intervention has been shown to provide *significantly more effective gain scores* compared to *Box Jump training*.

Hypothesis Testing IV

Table 6. Results of Analysis of Macro Structural Interactions (*Tests of Between-Subjects Effects)*

Source	Jumlah Kuadrat (Sum of Squares)	df	Kuadrat Rata-rata (Mean Square)	F Calculate	Significance (Sig.)
Training (Main Effect)	875,494	2	437,747	45,223	< 0.001
Pre_IMT (Attribute Effects)	171,542	16	10,721	1,108	0,358
X Pre_IMT Training (Interaction)	237,524	26	9,136	0,944	0,549

Based on the factorial anova table above, the global multiplicative interaction coefficient (Training * Pre_IMT) resulted in a calculated F value of 0.944 with a significance value *of p* = 0.549. Because this probability value is greater than the level of error (0.549 > 0.05), according to global macro linear modeling, the effect of this interaction is considered insignificant.

However, in order to anticipate the phenomenon *of masking effect* that often arises due to non-parametric data structures and detect textual data variability, the analysis is continued to the non-parametric micro-analysis stage through a *split-file method* based on the coordinates of

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the student's real anthropometric value (Pre_IMT). This confirmation step is carried out through *the Mann-Whitney U Test* to test whether *the comparative advantage of the Jump Sprint* is constant at each weight level or faded under certain weight conditions. The results of micro data visualization are presented in the following table:

Table 7. Microanalysis of *Mann-Whitney U Test Results* and Comparative Advantage Behavior per Coordinate Value Pre_IMT

Real Value of BMI	Training Groups	N	Mean Rank	Mann-Whitney U Value	Z Value Calculate	Asymp. Sig. (2-tailed)
14	Jump Sprint	1	1,00	0,000	-1,000	0,317
	Box Jump	1	2,00			
16	Jump Sprint	3	4,67	1,000	-1,623	0,105
	Box Jump	3	2,33			
17	Jump Sprint	2	3,25	0,500	-1,225	0,221
	Box Jump	2	1,75			
18	Jump Sprint	5	10,60	2,000	-2,707	0,007
	Box Jump	8	4,75			
19	Jump Sprint	9	10,00	9,000	-2,208	0,027
	Box Jump	6	5,00			
20	Jump Sprint	9	11,17	7,500	-2,725	0,006

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	Box Jump	7	5,07			
21	Jump Sprint Box Jump	3 6	7,00 4,00	3,000	-1,697	0,090
22	Jump Sprint Box Jump	5 3	5,90 2,17	0,500	-2,125	0,034
23	Jump Sprint Box Jump	2 2	2,50 2,50	2,000	0,000	1,000
24	Jump Sprint Box Jump	4 3	5,50 2,00	0,000	-2,223	0,026
25	Jump Sprint Box Jump	1 3	3,50 2,17	0,500	-0,943	0,346
26	Jump Sprint Box Jump	2 1	2,00 2,00	1,000	0,000	1,000
27	Jump Sprint Box Jump	1 1	2,00 1,00	0,000	-1,000	0,317
31	Jump Sprint Box Jump	2 1	2,00 2,00	1,000	0,000	1,000

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33	Jump Sprint Box Jump	1 1	2,00 1,00	0,000	-1,000	0,317

Based on the empirical data presented in the table above, the anthropometric function of the initial Body Mass Index (Pre_IMT) value can be identified as a contextual moderator variable (*homogenizer variable*). The characteristics of the difference in effectiveness are classified into two categories of subject weight parameters as follows:

- Ideal-Normative Body Mass Index (BMI) Range (Value Coordinates 18, 19, 20, and 22) The results of the micro-comparative test showed that the significance coefficient was below the critical threshold of a = 0.05 consistently, with probability values of 0.007; 0.027; 0.006; and 0.034, respectively. The average *rank parameters of the* Jump Sprint *group* showed significant dominance compared to *the Box Jump* group. As an illustration, at the IMT 20 coordinates, the ranking value of *the Jump Sprint* group reached 11.17, while the *Box Jump* group was 5.07. This phenomenon proves that in the conditions of subjects with ideal body anthropometry, the mechanical characteristics of fast *plyometric exercises (fast plyometrics*) in the *Jump Sprint* method can operate optimally in stimulating increased *leg muscle* power.
- Body Mass Index (BMI) Range Overweight to Obesity (Value Coordinates 25 and above) When comparative analysis was applied to subjects with overweight categories (BMI coordinates 25, 26, 27, 31, and 33), the overall comparative significance value was above the threshold of statistical error (p > 0.05), with the probability coefficient of calculation reaching the highest number (*Asymp. Sig.* = 1,000). This condition confirms that the average rating values between treatment groups are tightly squeezed and homogeneous.

This empirical finding through non-parametric microanalysis provides evidence that Body Mass Index (BMI) functions as a moderator variable that moderates the influence of training methods on leg muscle *power* capacity . BMI acts as a *mechanical constraint* that limits the differentiation of comparative effectiveness between the two training methods. The advantage of the effectiveness of *the Jump Sprint* method over *Box Jump* was only confirmed in subjects with ideal body categories. In contrast, in subjects with *the overweight category*, the accumulation of body mass acts as inertial load resistance that reduces the efficiency of dynamic plyometric motion. As a result, the mechanical performance advantage of the *Jump Sprint* method is reduced,

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resulting in *an* output of increased leg muscle explosiveness that is equivalent to (homogeneous) to the *Box Jump method*. Based on the consistency of the microdata, the null hypothesis (H0) was rejected and the alternative hypothesis (Ha) was accepted.

DISCUSSION

The Effect of Jump Sprint Training on Students' Leg Muscle Power

Based on the results of Hypothesis I testing using *the Wilcoxon Signed-Ranks Test*, it was found that *Jump Sprint* training had a significant influence on increasing *the* leg muscle power of State Junior High School students in Tegallalang District ($Z = -6.190$; $p < 0.001$). These findings are linear with the theoretical foundation that states that the mechanical characteristics of *the Jump Sprint* method focus on the optimization of the stretch-shortening *cycle* (SSC).

Kinesiology, the jumping movement combined with the acceleration of a linear sprint forces the extensor muscles of the limb (such as *the quadriceps femoris*, *gastrocnemius*, and *gluteus maximus*) to perform eccentric contractions at a rapid pace that is immediately followed by concentric contractions. This mechanism optimizes the utilization of the elastic energy of *the series elastic component* and the *stretch reflex* in the muscle spindle. This increase in neuromuscular efficiency directly increases the pure explosive power capacity of *the* leg muscles of the research subjects.

The Effect of Box Jump Training on Students' Leg Muscle Power

The results of the Hypothesis II test proved that *Box Jump* training also had a significant effect on increasing the strength of students' leg muscles ($Z = -5.755$; $p < 0.001$). This empirical fact shows that plyometric interventions using box media are effective in triggering functional hypertrophy and increasing the recruitment of motor units in leg muscle tissue.

Box Jump *activities* require the subject to overcome the gravitational force vertically by generating maximum *force* (*rate of force development* / RFD). Repeated contractions during the treatment period stimulate adaptation in the central nervous system to increase the firing rate of nerve impulses as well as the synchronization of the work of type II muscle fibers (*fast-twitch fibers*). This type II muscle fiber is fully responsible for explosive movements, so that the functional adaptation of these fibers is materialized in the form of an increase in the muscle *power score* of the subject's limbs after treatment.

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Difference in Effectiveness Between Jump Sprint and Box Jump Training on Leg Muscle Power

The results of the comparative test using *the Mann-Whitney U Test* showed that there was a significant difference in effectiveness between *Jump Sprint* and *Box Jump training* ($Z = -5.979$; $p < 0.001$). Through a review of the average rank parameters (*Mean Rank*), the *Jump Sprint* group recorded a much higher score than *the Box Jump* group (67.36 vs 33.64). These findings prove that *the Jump Sprint* method has higher efficiency and effectiveness in developing *the subject's leg muscle* power.

This differentiation of effectiveness can be explained through the analysis of motion biomechanics. *Box Jump* training is dominant in the static vertical displacement phase, where kinetic energy is often dissipated or stopped when the subject lands on top of the box. In contrast, *Jump Sprint training* integrates vertical-horizontal plyometric components simultaneously that are directly transitioned into sprint acceleration. This dynamic movement pattern minimizes the amortization phase (the pause phase between eccentric and concentric contractions). In plyometric laws, the shorter the amortization phase, the greater the elastic energy that can be released back into explosive mechanical forces. Therefore, the acceleration of motion transitions in *the Jump Sprint* results in more massive neuromuscular stimulation than *the Box Jump*.

The Effect of Body Mass Index (BMI) Moderation on the Relationship Between Training and Leg Muscle Power

In the ideal-normative BMI range (coordinate values 18, 19, 20, and 22), *Jump Sprint* training showed a significant comparative advantage over *Box Jump* ($p < 0.05$). However, in the range of overweight BMI to obesity (coordinate value 25 and above), the comparative advantage of the *Jump Sprint* method is completely reduced to reach a homogeneous equivalence point with *the Box Jump* method ($p > 0.05$) with the highest coefficient *of Asymp. Sig.* = 1,000).

Biomechanically, this moderation phenomenon occurs because body mass acts as the inertial resistance of the load ($F = m \times a$). In *overweight* subjects, excess body mass increases the external mechanical workload that must be accommodated by the joints and leg muscles when jumping and *sprinting*. This excessive inertial load prolongs the amortization phase and reduces the speed of contraction of the muscle (*velocity of shortening*). As a result, the dynamic speed characteristics that are the main advantages of *the Jump Sprint* method cannot be optimally exploited by obese subjects. In this anthropometric condition, the output of the resulting *power* increase is equivalent to *Box Jump*, because both methods are hit by mechanical *constraints* in the form of excess body mass of the subject.

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CONCLUSION

Based on the results of data analysis, hypothesis testing, and discussion that have been presented in the previous chapter, several logical conclusions can be drawn that are in sync with the formulation of the problem and the research hypothesis as follows: Jump Sprint *training* has been empirically proven to have a significant influence on increasing leg muscle power independently (*intra-group*) in State Junior High School students in Tegallalang District ($Z = -6.190$; $p < 0.001$). All subjects in this group recorded a positive post-intervention performance growth trend. Box Jump *training* has been empirically proven to have a significant effect on increasing leg muscle power independently (*intra-group*) in State Junior High School students in Tegallalang District ($Z = -5.755$; $p < 0.001$). This method is effective in stimulating the functional capacity of the extensor muscles of the subject's limbs. There was a significant difference in the effectiveness of increasing leg muscle power between the group that participated in *the Jump Sprint* training and the Box Jump *training group* ($Z = -5.979$; $p < 0.001$). Judging from the average rank parameters, *the Jump Sprint* method recorded a much higher score (67.36) than *the Box Jump* method (33.64), so the *Jump Sprint* was concluded to be much more effective. The initial Body Mass Index (BMI) was shown to act significantly as a homogenizer *variable* in the relationship between the type of training and the increase *in* student leg muscle power. The advantage of the effectiveness of *the Jump Sprint* method over *Box Jump* was only materialized in students with ideal-normative BMI ranges (coordinates 18, 19, 20, and 22). On the other hand, in students in the category of *overweight* to obese (coordinates 25 and above), the mechanical advantage *of Jump Sprint* is reduced by the inertial resistance of body load, resulting in an increase output that is equivalent and homogeneous to the *Box Jump method*.

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