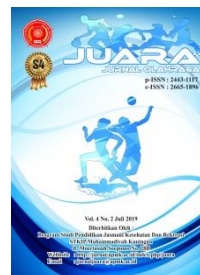




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THE EFFECT OF TIME CONTROL SPEED STRENGTH AND PLYOMETRIC TRAINING METHODS ON INCREASING LEG MUSCLE EXPLOSIVE POWER IN LONG JUMP ATHLETES OF PPLP WEST JAVA

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Abstract

This study is based on the author's observation of one of the supporting factors in the long jump sport, namely the explosive power of the leg muscles. This sport requires optimal explosive power of the leg muscles to achieve the best jump results. This study aims to determine the effect of the time control speed strength training method and the plyometric training method, as well as the differences between the two methods on increasing the explosive power of the leg muscles of PPLP West Java long jump athletes. The research method used in this study is the Two Group Pretest-Posttest Design experiment. The sample consisted of 8 PPLP West Java long jump athletes who were selected using the total sampling technique and divided into 2 groups, namely the TCSSM group and the plyometric group. The instrument used in this study was the standing broad jump test. Based on data processing and analysis, the TCSSM and plyometric training methods have a significant effect on increasing the explosive power of the lower legs in PPLP West Java long jump athletes. However, when viewed from the overall study, the plyometric training method showed better results in increasing the explosive power of the leg muscles in long jump athletes. So it can be concluded that the plyometric training method has a more significant effect than time control speed strength training on increasing the explosive power of leg muscles in long jump athletes of PPLP West Java. The author provides suggestions for further research on plyometric training to increase the explosive power of leg muscles using other methods or systems in plyometric training, according to what researchers have tried to find out its effect on increasing the explosive power of leg muscles.

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PENDAHULUAN

INTRODUCTION

Physical condition in the world of competitive sports is very important, because to achieve good performance, you must also have good physical condition. Physical condition consists of basic components including strength, endurance, flexibility and speed. Meanwhile, to improve it, training is needed in accordance with the principles of training. According to Sidik (2019, p. 21) "Training is a process of body activity that is carried out systematically, gradually, and the training load increases continuously based on the principles and norms of training". Physical condition development if carried out with a good training process can increase to the maximum stage that can be achieved by athletes. This proves that good physical condition will produce high achievement, marked by the athlete's ability to carry out a series of training and competitions without causing fatigue (Berliana et al., 2021). Harsono (1988, p. 100) states that "the development of overall physical condition is very important, therefore, without good physical condition athletes will not be able to follow the training perfectly". To get optimal and maximum push results, especially in the long jump, athletes must have prime physical condition and mastering the long jump technique is very important because it can produce good performance. In this case, the push technique or take-off phase is one of the techniques that determines the success of the jump, where this technique requires great leg muscle explosive power, the greater the leg muscle explosive power, the more certain it is that good push strength will affect performance and good results. Hayanti (2022) stated that "This physical component can be formed and developed if supported by elements such as strength and speed that grow and develop well." Based on the observations and observations that the author made in the field when the athletes were doing long jump activities, the author saw that the athletes' explosive power capabilities when doing the push-off were still low, so that the jump was less than optimal and the coordination of movements was still not perfect, it can be seen from the training process that there are still many techniques that have not been mastered by the athletes, especially

when doing the push-off or take-off phase during the long jump so that they always make mistakes in taking steps, when they are going to do the push-off the thighs are not lifted enough before landing, doing the push-off that is not optimal so that a horizontal pattern is not formed when flying and the jump results are short. This is caused by many factors and lack of training, explosive power (power) of the leg muscles and poor abilities will be the cause of the lack of optimal explosive power capabilities. Given the importance of explosive power (power) of the leg muscles in the long jump sport, training is needed to obtain good explosive power. Training is a means to improve physical condition. Explosive power can be obtained through training that is carried out systematically and repeatedly over a long period of time, with loading that increases progressively and individually. To obtain explosive power of the leg muscles, proper training is needed. Therefore, trainers must be careful and precise in implementing training programs. Efforts to increase leg muscle power can be done with weight training using the TCSSM and plyometric methods, where weight training is power training with external weights or can be interpreted as using a tool to provide a load in training. While plyometrics is training to increase power with pressure or load generated from the body weight of a person doing the exercise without any additional load from the tool. This is in accordance with Yunyun Yudiana, Herman Subardjah (2019) who stated that "Training power can be done by means of external loading or only with one's own body weight". The method with the addition of external load can use the TCSSM training method, while the training method that uses one's own body weight can use the plyometric training method.

METODE

The method used in this study is the experimental method, Sugiyono (2011, p. 107) stated that "Experiment can be interpreted as a research method used to find the effect of certain treatments on others in controlled conditions". The purpose of this study was to reveal and determine whether or not there is a

causal relationship between the two training methods on the effect of the Time Control Speed Strength and Plyometric training methods in increasing the explosive power of leg muscles in long jump athletes. The design of this study used the Two-Group Pre Test - Post Test Design. The sample used in the study was 8 people, with the sampling technique using the total sampling technique. The research instrument used was the standing broad jump test.

FINDINGS AND DISCUSSION

Findings

This analysis is intended to find out the general description of the research data in the form of average values and standard deviations in each group. The following is a description of the results of the calculation of the data obtained during the pretest and posttest, before and after the implementation of treatment with the time control speed strength and plyometric training method on long jump athletes of PPLP West Java using the standing broad jump test. The results of the descriptive analysis can be seen in Table 1.1

Tabel 1.1 Hasil Analisis Deskriptif Secara Umum

Kelompok	Pretest		Posttest		Gain	
	Mean	Sd	Mean	Sd	Mean	Sd
TCSSM	261.5	31.565	272.25	32.979	10.75	2.217
Plyometric	262.25	24.905	274	23.509	11.75	1.708

The calculation results in Table 1.1 show the average results, standard deviations and differences of the two groups. Where the data obtained for the TCSSM training group had an average initial test of 261.50 with a standard deviation of 31,565. While the average final test was 272.25 with a standard deviation of 32,979. The difference obtained in the TCSSM training group was an average of 10.75 and a standard

deviation of 2,217. Meanwhile, the Plyometric training group had an average initial test of 262.25 with a standard deviation of 24,905. While for the final test, an average of 274 was obtained with a standard deviation of 23,509. The difference obtained in the Plyometric training group was 11.75 and a standard deviation of 1,708.

Tabel 1.2 Hasil Uji *Paired T-test* kelompok TCSSM dan plyometric

Kelompok	Mean	Std. Deviation	Std. Error Mean	t	Sig. (2-tailed)
TCSSM	-10.75	2.217	1.109	-9.696	0.002
Plyometric	-11.75	1.708	0.854	-13.76	0.001

Based on table 1.2 above, the TCSSM training method group has a significance value (0.002) <0.05, so H₀ is rejected and H₁ is accepted. So it can be concluded that there is a significant effect of the time control speed strength training method on increasing the explosive power of leg muscles in long jump athletes. While the plyometric training method group has a significance value (0.001) <0.05, so H₀ is rejected and H₁ is accepted. So it can be concluded that there is a significant effect of the plyometric training method on increasing the explosive power of leg muscles in long jump athletes.

Tabel 1.3 Hasil Uji *Independent T-test* kelompok TCSSM dan plyometric

Kelompok	Mean	t	df	Sig. (2-tailed)
TCSSM	10.75	-0.715	6	0.502
Plyometric	11.75			

Based on table 1.3 above, both experimental groups with TCSSM and plyometric training methods with a significance value (0.502) > 0.05, then H₀ is accepted. So it can be concluded that there is no significant

difference in the influence between the time control speed strength and plyometric training methods on increasing the explosive power of leg muscles in long jump athletes of PPLP West Java. This means that both the time control speed strength and plyometric methods are equally effective in increasing the explosive power of leg muscles. However, when viewed

Discussion

Based on research data through initial and final test measurements, as well as statistical calculations for hypothesis testing in the TCSSM and Plyometric groups, it can be concluded that the plyometric training method has a more significant effect than time control speed strength training on increasing explosive power of leg muscles in long jump athletes of PPLP West Java.

It is known based on the evidence that has been described above, it shows that the plyometric training method can be said to be more effective than the time control speed strength method on increasing explosive power of leg muscles. Plyometric training involves fast and sudden movements, which trigger a reflex response from the neuromuscular system. Sudden muscle stretching during the eccentric phase (when jumping) is followed by strong concentric contractions (when pushing to jump high and far).

In plyometric training, intense and fast movements are performed repeatedly in training sessions. This allows the muscles to experience deep training and increase their explosive power over time. Repetition of movements allows physiological adaptation in the muscles that can result in increased explosive power and muscle strength that are specifically needed in the long jump. A relevant analogy to explain the intensity of movement in plyometric training. When jumping or doing plyometric exercises, athletes must exert

from the overall results of the study, although there is no statistically significant difference in influence between the two training methods, the results of the study show that the plyometric training method has a better increase compared to the time control speed strength training method on increasing the explosive power of leg muscles in long jump athletes.

maximum effort in a short period of time, similar to the instant response when someone steps on hot coals.

TCSSM is a training method that focuses more on aspects such as speed and strength in preparation for the long jump. However, unlike plyometric training, this method does not have strict "time control" in the sense of measuring the time precisely when performing a jump or push. TCSSM emphasizes more on aspects of technique, muscle strength, and coordination rather than monitoring the very specific time when performing the push in the long jump.

The main difference between plyometric training and the TCSSM training method in the long jump is that plyometric training focuses more on explosiveness, where muscle stretching is followed by a sudden strong contraction to produce explosive power. On the other hand, TCSSM focuses more on developing strength, speed, and technique relevant to the long jump, without emphasizing strict time control.

Thus, plyometric training tends to be more effective in increasing the explosive power of leg muscles because it focuses on intense, fast and repetitive movements, which allow the muscles to produce greater explosive power in a short period of time.

This training process has movement characteristics similar to what happens in the actual long jump movement, where the muscles reflexively provide extra thrust to improve movement performance. Plyometric training

emphasizes very fast and strong muscle contractions, which are in line with the contraction speed required in the long jump. This makes plyometric training more specific and relevant to increasing leg muscle explosive power compared to the TCSSM method.

Plyometric training involves repeated jumping and bouncing movements, which trigger fast and explosive muscle contractions. In contrast, weight training using the TCSSM method tends to rely on slower and more continuous muscle contractions to overcome heavy loads. These different muscle contraction characteristics can cause differences in the resulting muscle explosive power.

Plyometric training shows the full power characteristics of muscle contractions with a very fast response, dynamic loading or very complicated muscle stretching (Radcliffe, J. C & Farentinos, 1985, p. 111). According to Chu (2013, p. 3) plyometrics has the advantage of utilizing the force and speed achieved by accelerating body weight against gravity, this causes the speed force in plyometric training to stimulate various sports activities such as jumping, running and throwing more often than weight training or can be said to be more dynamic or explosive.

Motivation is an internal drive that drives someone to achieve certain goals and achievements. In the context of training, motivation plays an important role in helping athletes achieve optimal performance. In plyometric training, motivational factors can be the key to increasing the explosive power of leg muscles in long jump athletes. Because plyometric training involves a series of explosive movements that require maximum effort and high focus from athletes. The speed and intensity of these movements challenge athletes to reach their peak ability levels, athletes feel more motivated to do so because of the range of abilities that must be achieved, this can make plyometric training so interesting and motivating.

SIMPULAN

Based on the results of the research, calculations, and analysis of research data that have been carried out, regarding the effect of time control speed strength and plyometric training methods on increasing explosive power of leg muscles, it can be concluded that:

1. There is a significant effect of the Time Control Speed Strength training method on increasing explosive power of leg muscles in long jump athletes of PPLP West Java.
2. There is a significant effect of the Plyometric training method on increasing explosive power of leg muscles in long jump athletes of PPLP West Java.
3. The plyometric training method has a more significant effect than time control speed strength training on increasing explosive power of leg muscles in long jump athletes of PPLP West Java.

The author would like to convey several things as input and suggestions after carrying out the entire series of this research as follows:

1. For coaches and trainers of each sport category to be able to apply the time control speed strength and plyometric training methods to increase explosive power of leg muscles to support the performance results of athletes when competing.
2. For athletes, when doing training, they should do it seriously, maintain discipline in time control, speed, strength and plyometric training to improve and support performance so that personal quality is maximized.

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