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EFFECT OF TRAINING LEG MUSCLE POWER ON THE ACCURACY AND SPEED OF SERVICE AS TAKRAW IN CENTRAL JAVA MAN PLAYERS.

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ABSTRACT

This research looks for the effect of treatment of an exercise whether training is a power leg type of exercise jump to box with an incline bound has an effect on the speed and accuracy of the takraw service. The basis of this method is that experimentation is a research technique based on experiment by holding a preliminary test and a final test then tested for correctness. Research method is an absolute requirement of a study. The use of methods in scientific research must be precise and lead to the goal, provide accurate outlines and propose new conditions. In finding answers to this research, various methods such as survey, descriptive, correlation or experimental methods are used. In this study is to find whether there is a cause and effect relationship, in connection with which used in this research is the experimental method. Based on theF value $_{calculated}$ for the speed data of 5,612 <F $_{table}$ of 0.039 with a significance value of 0.05, which means that there is a difference in the increase in speed between the two groups after being given training, while for the accuracy data it is obtained F_{count} = 0.621 with p value = 0.261> 0.05, which means that there is a difference in the increase in accuracy between the two groups after being given the exercise. Based on the results of the analysis, it provides an overview of training power leg using plyometrics with inclne bound and jump to box exercises that have an effect on increasing service speed and affect the accuracy of service.

Keywords: *Learning Outcomes of sepak takraw sports, Learning Methods, and Physical Skills*

INTRODUCTION

The development of sports is accelerating, in line with the development of science and technology. Science and technology play a big role in improving today's sports performance. The sport of takraw is one of the fastest growing sports in Southeast Asia and is becoming known by several European and American countries. The development of this sport abroad will lead to increasingly fierce competition, therefore this sport requires serious attention to fostering achievement in this country. The sport of Sepak takraw is a national

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culture that has long developed in the homeland since the Dutch colonial era. Sepak takraw has existed and been played by Indonesians, especially those who live in coastal areas, such as the Riau Islands, West Sumatra and South Sulawesi which are known as soccer. Sepak takraw is played at welcoming guests, at people's parties and during leisure time then competed from RT to National level.

The achievements of the Central Java football takraw branch can be seen starting at POPNAS 2005 in Medan. 2009 POPNAS in Yogyakarta. In *event* this, the Central Java team was only able to rank second by winning a silver medal in the men's team number and the non-tournament team. Putra Central Java is still under South Sulawesi. Likewise in the implementation of the 2009 National Championship in Kuningan Jakarta, Central Java's achievements were not much different from the previous National Championship. In team matches and double of 2 game numbers in the semi-final, Central Java lost to West Sumatra while the team lost to South Sulawesi. (Where the Central Java men's team lost 2-1, in the men's team number). If we look at the results of the average score obtained by Central Java, it cannot be denied that the Central Java takraw team is under South Sulawesi. With many failed services and can be received well by opposing players due to the lack of hard and accurate service placement on the opposing side so that the first ball is easily received by the opposing side. For this reason, players or tekong must need to train their muscles in *power* legorder to increase their hard and accurate serving ability, so that opposing players find it difficult to receive hard and accurate services. In an effort to improve the technique of playing the sport of takraw, there are three positions that must be considered, developed and namely, smash, serve, *fixedbolking*,, and bait. In addition to the basic techniques of Sepak Takraw must be mastered: sila football, soccer, memaha, *headings*. All these basic techniques are an inseparable component.

Servicing is one of the basic techniques of kicking which is intended to start (open) a game or match. Early football is usually done by players called "Tekong", namely players who are in the middle back. Tekong or players who serve must have good physical components, one of which is *power* leg. Because it has *power* good leg, so that the ball that bounces or is fed by the right wedge can serve directed, accurately and hard to the opponent so that it produces a number. Servis is the most important attack in getting a winning number in a match. Failure or failure to serve means a missed opportunity for the team to score. Tekong should be able to make a good serve and be able to find weak targets from opponents, and be able to score points. In performing a good service, it is necessary to pay attention to the movements at the start, repulsion, posture, foot contact with the ball and when it lands on the floor (Interview with national coaches Setya Budi and Bambang Edi, March 5, 2011)

The Student Training Education Center (PPLP) is a place for for training for players who excel at the student level, to be precise in the soccer takraw branch in Salatiga which has been running since 1997. Activities in PPLP are required for school education and achievement in sports such as: football, takraw and athletics for looking for seeds or candidates for national and international athletes, especially in the soccer takraw branch that has produced the most national players. And this is evident in every event in the international championship football takraw players in Central Java always participate in defending the name of Indonesia in the Sea Games, Asian Games and world championships.

Performing services that are on target and hard is not easy as we imagine there are many factors of difficulty and problems for athletes who exercise leg muscle explosive power, looking for a physical training model is very necessary to do so that it will make it

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easier for coaches, athletes or coaches in forming takraw athletes especially in the service position in the game Sepak Takraw.

Physical condition is one of the prerequisites that are indispensable in any effort to increase the achievement of an athlete, it can even be said that the basis of the starting point for a sports achievement goal Physical condition is an integral part of the components that cannot be separated, either for improvement or maintenance. This means that every effort to improve physical conditions must develop all these components, although it needs to be done with a priority system according to the conditions and status needed (M Sajoto, 1998: 57)

Physical exercise in its implementation is more focused on the process of developing the athlete's physical condition as a whole. , and is one of the main and most important factors that must be considered as a necessary element in the training process in order to achieve the highest achievement. Its main objective is to increase the athlete's functional potential and develop biomotor abilities to the highest degree. To increase explosive *power,* one of them is the type of training *plyometric* and weight training with the limitation of the problems that exist in this study, the researchers took one type of training *plyometric*.

training *Plyometric* helps athletes in various sports such as football, basketball and other branches, especially in the soccer takraw branch, in that this service ability really requires this type of training *plyometric* to increase the explosive power of the leg muscles in serving. Any sporting skill that demands a *power* combination of and a combination of strength and speed can benefit from plyometric training. Bompa recommends 6-8 reps, totaling 1 to 3 sets, with a break of 2-4 minutes per set. These exercises must be carried out regularly, systematically and programmed in order to get maximum results. So in the implementation of these exercises must be considered the elements that affect the increase in good explosive power.

Ginther suggests obtaining explosive power with a complex training method. For example: *incline bound* and *jump to box* using the method *plyometric* exercises or ballistic training (Ginther, 2006: 3). Because our bodies will quickly adapt to choose the type of exercise so that it will be effective. Therefore variety in practice is very important. Exercise *incline bound* and *jump to the box* is just one type of exercises. *plyometric* This exercise should be done carefully in various and gradual ways. Form the exercise by using slow eccentric contractions and performing fast contraction movements by jumping. To find out the results of strength *power* legin players who serve (tekong) in this study, it is necessary to train them using the training method *plyometric* using the *incline bound* and *jump to box*. Where this type of training is a type of exercise *plyometric* that has been done for a long time by successful athletes. The explosive power of the leg muscles in serving in this Sepak Takraw game is very necessary to produce strength, speed in making a shot, a strong and fast kick in order to produce
a hard serve and can score points in serving. Based on the description above, the researcher sees the need to conduct research that aims to determine whether there is an effect oft raining *power* legon the accuracy and speed of serving Sepak Takraw in Central Java male players.

RESEARCH METHODOLOGY

This research is an experimental study, because the data obtained is the result of providing training on the conditioned variables of the sample within a certain time. The experimental pattern used is the pre-test-final test, because it will look for differences in each group, the research design used is an experimental design with a pre-test and a final test pattern (*two graup pre-test - post-test design*). So in this design there is a pretest, before

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being treated. Thus the results of treatment can be known to be more accurate, because it can compare with the conditions before being treated. This design can be described as follows: (Suharsimi arikunto 2006: 85-86)

Experiment 1	O11----------O12
Experimen 2	O21---------- O22

Experiment 1 : exercise *bound*
Experiment 2 : exercise *Jump to box*
O1 : Pre test value (before being given training)
O2 : Post test value (after being given training)
O11 : Pre test experiment 1 with *incline bound*
O12 : Post test experiment 1 with exercise *jump to box*
O21 : Pre test experiment 2 with exercise *incline bound*
O22 : Post test experiment 2 with exercise *jump to box*

This research looks for the effect of treatment of an exercise whether training is a *power* leg type of exercise *jump to box* with an *incline bound* has an effect on the speed and accuracy of the takraw service. The basis of this method is that experimentation is a research technique based on experiment by holding a preliminary test and a final test then tested for correctness.

Research method is an absolute requirement of a study. The use of methods in scientific research must be precise and lead to the goal, provide accurate outlines and propose new conditions. In finding answers to this research, various methods such as survey, descriptive, correlation or experimental methods are used. In this study is to find whether there is a cause and effect relationship, in connection with which used in this research is the experimental method. Experiment is a way to find a causal relationship (causal relationship) between two factors that are deliberately caused by the researcher by eliminating or reducing or setting aside factors. -Other disturbing factors, experiments are always carried out with the intention of seeing the consequences of a treatment (Suharsimi Arikunto, 2006: 3).

RESULT

The results of this study are about the effect of *power* leg on the accuracy and speed of service in the game of Sepak Takraw in Central Java male players. *The power* legin question is divided into two types of exercises, *plaio metric* namely the *incline bound* and the *jump to box*. The data obtained were analyzed descriptively and statistically using multivariate analysis.
The description of the accuracy and speed of service of both types of exercise can be seen in the table below :

Data	Source of variation	Exercise Incline bound		Exercise Jump to box	
		Pre test	Post test	Pre test	Post test
Speed	Highest	0.28	0.16	0.16	0.16
	Lowest	0.16	0.13	0.14	0.13
	N	6	6	6	6

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	Average	0.19	0.14	0.15	0.14
	Standard Deviation	0.01	0.05	0.01	0.01
Accuration	Highest	25.00	29.00	20.00	30.00
	Lowest	10.00	15.00	13.00	13.00
	N	6	6	6	6
	Average	17.33	17.67	15.33	18.17
	Standard Deviation	6.65	3.83	2.73	6.15

The table above shows that the average initial service speed of the two groups relatively increased, as evidenced by the average initial speed of each for the exercise, *incline bound* namely 0.19 m / s and the average service speed for the exercise, *jump to box* namely 0.15 m / s. Judging from the average post test service speed of the two groups is relatively the same. The average service speed after the exercise *incline bound* was 0.14 m / s while after the exercise *jump to box* was 0.14 m / s. So each of the two exercises has increased speed.

The initial test score of accuracy in group 1 was 17.33, while in group 2 it was 15.33. Judging from the accuracy between the exercises, *incline bound* and *jump to box* there is no significant difference, as evidenced by the average accuracy of 17.67 for the *incline bound* and 18.17 for the *jump to box*. Both exercises have both improved servicing accuracy.

1. Normality

Test Data normality test as a prerequisite for the multivariate test is used by Kolmogorov Smirnov with the assistance of the SPSS program. If the *p value is* > 0.05, it can be concluded that the data is normally distributed. Normality test results can be seen in the annex and summarized in Table 2.

Table 2. Test Results Normalitas Data

Data		Kolmogorov Smirnov	*p value*	Signifikant	Criteria
Speed	Pre test	0,492	0,05	0,969	Normal
	Post test	0,697	0,05	0,716	Normal
Accuracy	Pre test	1,241	0,05	0,092	Normal
	Post test	1,064	0,05	0,190	Normal
Gain	Speed	1,015	0,05	0,254	Normal
	Accuracy	0,822	0,05	0,509	Normal

Seen in the table, the *p value* for each data exceeds 0.05 which means that the data is normally distributed because it has avalue *Kolmogorov Sminov* with a significant> 0.05.

2. Homogeneity

Test Data homogeneity test as a prerequisite for the multivariate test used the Levene test with the help of the SPSS program. If the *p value* > 0.05, it can be concluded that the data is homogeneous. Homogeneity test results can be seen in the annex and summarized in Table 3.

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Table 3. Homogeneity Test Results

Data		Kolmogoro	P value	Criteria
Speed	Pre test	0,692	0,716	Normal
	Post test	0,672	0,758	Normal
Accuracy	Pre test	1,293	0,071	Normal
	Post test	1,084	0,190	Normal

Data		Levene test	P value	Criteria
Pre test	Speed	1,713	0,220	Homogen
	Accuracy	3,056	0,111	Homogen
Post test	Speed	0,819	0,387	Homogen
	Accuracy	0,446	0,446	Homogen

Table 3 shows that the *p value* of each data exceeds 0.05, which means that the data is homogeneous. Thus it can be concluded that multivariate analysis can be continued.

3. Hypothesis Test The

results of the multivariate test for data on increasing speed and accuracy of service can be seen in the appendix and summarized in table 4 below.

Table 4 Manova Test Results for Speed and Accuracy Increase Data

Source of variation	Dependent variable	Sum of squares	Dk	Average of squares	F $_{hitung}$	*P value*	Criteria
Corrected Model	Speed	0.143	1	0.143	5.612	0.039	Siq
	Speed	0.041	1	0.041	0.621	0.261	Siq
Intercept	Speed	0.433	1	0.433	17.051	0.002	Siq
	Speed	0.234	1	0.234	1.482	0.251	Siq
Exercises	Accuracy	0.143	1	0.143	5.612	0.039	Siq
	Accuracy	0.041	1	0.041	0.621	0.261	Siq
Error	Accuracy	0.254	10	0.0254			
	Accuracy	1.58	10	0.158			

Table 4 shows that theF value $_{calculated}$ for the speed data of 5,612 <F $_{table}$ of 0.039 with a significance value of 0.05, which means that there is a difference in the increase in speed between the two groups after being given training, while for the accuracy data it is obtained F_{count} = 0.621 with *p value* = 0.261> 0.05, which means that there is a difference in the increase in accuracy between the two groups after being given the exercise. Based on the results of the analysis, it provides an overview of training *power* leg using *plyometrics* with *inclne bound* and *jump to box* exercises that have an effect on increasing service speed and affect the accuracy of service. More details can be seen in the test results *paired t* as in table 4.6.

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Table 4.5 Results of the Test for Increasing Speed, Accuracy and *Power* Limb

Upgrade Test	Exercise	Mean enhancement	T	dk	*p value*	Criteria
Speed	*Incline bound*	-0.044	-2.95	5	0.032	Increase
	Jump to box	-0.011	-3.05	5	0.028	Increase
Accuracy	*Incline bound*	0.333	0.11	5	0.913	Not Increasing
	Jump to box	-2.833	-1.12	5	0.312	Not Increasing
Power limbs	*Incline bound*	-2.667	-3.32	5	0.021	Increase
	Jump to box	-4.000	-3.23	5	0.023	Increase

Table 5 shows that there is a significant increase in service speed after participating in the exercises *incline bound* and *jump to box*, as evidenced by the results of the test *paired t* with *p values* of 0.032 and 0.028 <0.05. After doing the exercises *incline bound* and *jump to box* , there was no significant increase in service accuracy as evidenced by the results of the test *t* with a *p value* of 0.913 and 0.312> 0.05

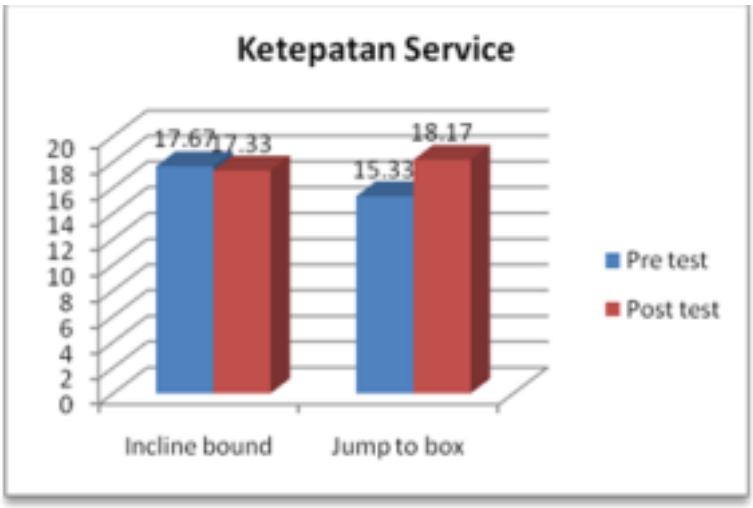

Figure 2. Improved Service Accuracy after Following *Incline bound* and *Jump to box* Exercises also affects the increase in *power* leg, this is evident from the results of thetest *paired t* with *p value* = 0.021 and 0.023 <0.05. This means that there is an increase in *power* legafter being given theexercises *incline bound* and *jump to box* in this study.

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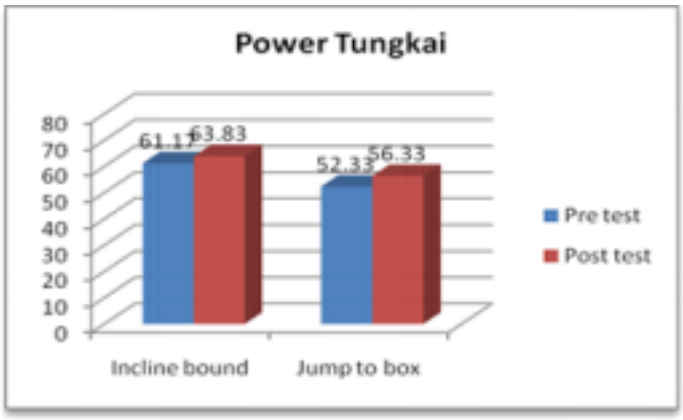

Figure 3. Results of Increased *Power* Leg after FollowingExercises *Incline bound* and *Jump to box*

DISCUSSION

Service in the game Sepak takraw plays an important role in getting points. These services are those that have high speed and are right on target so that the opponent is difficult to accept. The ball resulting from the service in the Sepak Takraw game will form a parabolic movement or an inflated ball movement if it is done by a player with a less height, as a result the ball will be easily accepted by the opponent. Conversely, if the top service can be done in a high position, it will form a sharp linear movement so that it is difficult to be accepted by the opponent, so it requires jumps or bursts related to explosive or *power* leg. In addition to bursts, *power* leg cn also be used to propel the ball. According to the biomechanics F = ma, the thrust (F) is directly proportional to the acceleration (a), meaning that the ball's acceleration will be greater if the ball gains momentum from the thrust of the big hitting foot.

Speed is absolutely necessary, especially in serving the takraw game. Tekong or players who serve are required to have the ability to kick hard and fast. Therefore, Sepak Takraw players have to get enough jumping training in order to have *power* great leg. In this case Soedjarwo.dkk (1996: 21) argues that jumping training is basically an exercise of the leg muscles, but a more specific goal is to increase the explosive power during service movements, so the ability to shoot or kick is very important in the game. sepak takraw. To get strong leg muscles, a Sepak Takraw player must have their legs trained programmed and systematically. Thus, Sepak Takraw players must get sufficient leg muscle training so that the leg muscle explosive power increases.

The incline bound is an exercise in jumping up and down with both legs together. With exercises carried out on a hill or stadium ladder, the resistive force or constant overload is imposed on the muscle system used for *bounding.* This constant overload helps develop strength and *power* leg. *The power of* leg the players who were subjected to the exercise treatment was *incline bound* able to increase from 61.16 to 63.83 or an increase of 4.4% and the results of the t test obtained *p value* = 0.021 <0.05, which means that there was a significant increase in *power* leg after following the treatment.exercise *incline bound*.

Another exercise to increase *power* legis the *jump to box*. In doing so, players are required to pass obstacles in the form of a box with a height of 50 cm. This activity requires the player to make continuous jumps to allow for an increase in *power* leg. The execution of this exercise is quite easy and the movements are quite dynamic, so that the player can fully

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concentrate on the jumps being made. This will allow for a considerable increase in the explosive power of the leg muscles. Because the movements are quite easy, the jump jump motion in this exercise *Jump to box* is done quickly. This allows an increase in the speed of leg muscle strength. Through this exercise *jump to box* , the leg muscle strength which was originally 52.33 increased to 56.33 or increased by 7.6% and it was proven by the results of the t test with *p value* = 0.023 <0.05.

The results of data analysis using multivariate showed that the exercise *incline bound* had a significant effect on service speed compared exercise *to the jump to box*. This speed of service cannot be separated from the influence of the *power of* leg the player serving. With the exercise *incline bound* , the activity of jumping stairs generates more *power* , resulting in a hard burst when serving, resulting in a faster serve. The average service speed due to the exercise *incline bound* reaches 0.186 meters / second, while those who take the exercise *jump to box* reach 0.153 meters / second. To serve in Sepak Takraw does not require jumping, but leg muscle strength is needed to be able to hit the ball hard and fast, so practicing jumping up stairs without pausing will sustainably produce strength and speed. This is what causes the service results to be faster.

Unlike the *jump to box* by jumping to the first box, descending from the box and jumping to the next box. This exercise allows the player to have a break to rest briefly, as a result the player only has *power* leg but less discharge. This results in serving less quickly than the exercise *incline bound*.

The results showed that the mean score of service accuracy due to the exercises *incline bound* and *jump to box* was relatively the same. This proves that training *power* leg has no effect on service accuracy. Service accuracy is closer to the level of accuracy in servicing. This condition is closely related to other factors such as the player's technique, height, which allows the player to more freely direct the ball and the intuition or filing that is had as a result of habit or training. Leg *power* training is a physical exercise that emphasizes strength and speed. In this physical exercise, which plays an important role in producing a very large service strength and speed, compared to the accuracy, because the accuracy is the result of the coordination of a combination of technical training.

Based on the research results achieved, it turns out that the *incline bound* and *jump to box* exercises significantly affect service speed but have no effect on service accuracy. Therefore there needs to be a follow-up study that combines
training *power* leg using the *incline bound* and *jump to box* and continues with service training.

CONCLUSION

1) There is a difference in the effect of the training method *power* leg with *incline bound* training and training *jump to box* on service speed in the game of Sepak takraw. Through the exercise, the *incline bound* effect of service speed is greater than the exercise *jump to box*.
2) There is no difference in the effect of the training method *power* leg with the *incline bound* training and the training *jump to box* on the accuracy of service in the takraw game.

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