

# The Effect of Exercise Methods and Leg Muscle Power on Roll Spike in Sepak Takraw

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**Abstract** –This study aims to determine the effect of random and random block training methods as well as strong and weak leg muscle power on the roll spike. The research method used was an experiment with a 2x2 factorial research design with a sample of 40 sepak takraw athletes. The sampling technique used in this study was purposive sampling. The results of this study are: 1) there is a significant difference between exercises using the random and the random block methods, 2) there is a significant difference between strong and weak leg muscle power, 3) there is no interaction between the training method and leg muscle power on the roll spike ability in sepak takraw.

**Keywords** –Exercise Methods, Leg muscle power, Roll Spike, Sepak Takraw

## 1. Introduction

Currently, sport activity for various people has become one of the positive activities to maintain physical fitness. One of them is a sport that is modified into a game, whether done individually or in groups with the aim of improving health and as a means of achievement[1]. Examples of games that are played in groups are volleyball, soccer, basketball, and sepak takraw. Sepak takraw is a very popular sport for both young and old people[2].

In addition, sepak takraw sport is also used as an achievement for various championships or competitions at the regional, national, and international levels. In the XX PON which will be held in Papua Province in 2020, sepak takraw sport is one of the sports that will be contested among 37 other sports. The management of the Indonesian Sepak Takraw Association (PSTI) in Central Java is targeting a minimum of two gold medals at the 2020 PON in Papua. The sepak takraw sport is played by kicking the ball with the player's foot to pass through the net barrier. Furthermore, the ball used is different from the other ball games—in sepak takraw the ball used is made of rattan[3]. Sepak takraw is a combination of three kinds of games, i.e. football, volleyball, and badminton[4].

The combination of gymnastics and acrobatics in Sepak takraw is a basic movement toward the championship[5]. Acrobatic movements are performed during the smash. The smash is a movement that must be mastered by sepak takraw players because the dominant smash move will score and be performed to attack the opponent[6]. There are several types of smash movements in the Sepak takraw game, i.e. roll spike (somersault), kedeng smash, sunback spike, foot smash[7]. Of the several types of the aforementioned smash, roll or somersault spike is one of the smashes that have a high difficulty level compared to other smashes[8]. It is known that there are many athletes who experience difficulties when doing roll spike training (somersault). Not only coaches, athletes also experience the same thing when training roll spike (somersault) movements because there is no special roll spike (somersault) training program[9]. The success in performing the Sepak takraw movement requires physical training including: good strength, flexibility, balance, and power so that the sepak takraw athlete's skills to make achievement and proficiency in movement are supported[10]. Power is directly proportional to muscle strength. Therefore, the size of the power is determined by the size of the muscle strength[11].

Mastery of basic technical skills from one another in Sepak takraw has become an inseparable unit. This is used to get maximum results during the championship[12]. In addition to basic techniques, Sepak takraw has special techniques that must be mastered including: serving, receiving serves, passing, smashing, and blocking. Mastery of these techniques can be played optimally if they are systematically trained by a qualified trainer by providing methods during practice[13]. The importance of providing the right and correct method when practicing makes athlete's performance increase and the demands of the roll spike movement are fulfilled so that they are perfect when performing the movement. Training programs that can increase leg muscle power are polymeric exercises in the form of tuck jumps and stadium hops[14]. The method that can be used in the sepak takraw game is divided into 3: block is a training method carried out by playing one skill, random is a

training method with different skills, and a mixture of block and random methods of practicing several skills with block and random [15]. The training methods used are the block, random, and block-random training methods which are specifically performed for smash practice by giving the ball without changing the height and distance to be smashed with the roll spike technique. Meanwhile, random method, i.e. the giving of balls by varying the height and distance [16]. From the explanation above, it becomes the basis for the author to design a study on the method of smash training related to leg muscle strength against the somersault smash/roll spike.

To improve leg muscle power, an ability test is needed before the championship takes place. One of which is a test of the leg muscle ability of sepak takraw athletes in Central Java using the vertical jump test to face PON Papua 2020 with moderate and less categories. From a total of 12 male athletes, only 3 are categorized as moderate and 9 athletes are categorized as lacking. In addition, the Central Java PON medal tally for men category from 2004 to 2016 has decreased. In 2004, which was carried out in Palembang, the Central Java men team won 3 gold medals and 1 silver medal. However, in 2016, the team only received 1 gold, 1 silver, and 1 bronze medal each.

The objectives of this study were: 1) to determine the main factors and interaction effects of the exercise method and leg muscle power, 2) to seek efficiency in improving the roll spike skill in the sepak takraw game. The benefits of this study are: 1) For sepak takraw coaches, they can use random training methods and strong leg muscle power to improve their roll spike skills in the sepak takraw game; 2) For sepak takraw athletes, it can provide new experience and expertise in improving the roll spike skills in the sepak takraw game; 3) For the general public, the sepak takraw game can also be an alternative sport to improve fitness and health.

## 2. Methods

The approach in this study is a quantitative approach, using an experimental method with a 2 x 2 factorial design based on the number of variables in each factor.

This type of experimental research includes two variables, i.e. the independent variable and the dependent variable. The independent variables of this study include: the training method, while the dependent variable is the result of the roll spike skill in the sepak takraw game, while the leg muscle power is the attribute variable. The variables of the exercise method and leg muscle power as independent variables were manipulated, i.e. using research treatment. The experimental treatment for the exercise method and leg muscle power variables was given to different groups, i.e. the randomized block method, strong leg muscle power, weak leg muscle power random training method, strong leg muscle power random block training method and weak leg muscle power random block method. Manipulation of the training method treatment was given from the beginning of the experiment to the end of the study, where the four participants did the exercises for 14 times or meetings, i.e. each exercise with a duration of 120 minutes.

The samples in this study were 40 athletes taken by purposive sampling technique. The instruments used were: 1) vertical jump test and 2) roll spike skill test in the sepak takraw game. To determine the more effective interaction between exercise methods and leg muscle power, the Tukey test was performed

## 3. Result and Discussion

The results of the study can be seen in the form of a table that has been presented with the following Independent-samples Test and other tests.

The Independent Sample Test Table shows that the significance value is  $\text{Sig. } 0.224 > 0.005$  (Figure 1). This means that the data for the two groups are homogeneous. Through the Independent-Samples Test difference test, it is proven that there is a significant difference between the random and block random training methods on the roll spike results in the sepak takraw game. This is indicated by the sig.2 significance value of  $0.00 < 0.05$ . Based on the mean difference data, it appears that the random and block random models have the same mean value of 6.800. This means that the two models (R and BR) have an effect on the roll spike results in the sepak takraw.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
R= Random; BR; Block Random	Equal variances assumed	1.735	.224	8.014	8	.000	6.800	.849	4.843	8.757
	Equal variances not assumed			8.014	6.113	.000	6.800	.849	4.733	8.867

Figure 1. Result of independent t-test

Table 1 show the result of leg muscle power to improve smash gulung. It appears that there are 20 people who show indication that leg muscle power training using the tuck jump method and the stadium hops have an influence on roll spike in the sepak takraw.

In the Wilcoxon test (figure 2), the significance is  $1.00 > 0.005$ . This means that there is no significant difference between leg muscle power training with the tuck jump method and the stadium hops on the roll spike in the sepak takraw.

However, from Table 1, it appears that the mean of leg muscle power and method have the same value. This means that leg muscle power training using the tuck jump method and the stadium hops is able to improve the roll spike ability in the sepak takraw.

Table 2 shows that the interaction of X2 (leg muscle power) vs X1 (method) on the roll spike has a significance value of  $0.00 < 0.05$ . This means that there is an interaction between the method and leg muscle power on the roll spike in the sepak takraw game.

Based on the results of the statistical calculation, the first data obtained is F-counts 17.150 meanwhile, F table is 4.150. This shows that F-count is greater than F table. This means that there is a difference in the effect of random training methods and random blocks on the spike roll skill in sepak takraw. Second, the data obtained from F-count 30.721 and from F-table 4.150 show that F-count is greater than F-table. Therefore, it can be said that there is a difference in the effect between athletes who have strong leg muscle power and weak leg muscle power on the roll spike skill in sepak takraw. The third is the data of F-count 2.221 and F table 4,150 show that F-count is smaller than F table. Therefore, it can be said that there is no interaction effect between the training method and leg muscle power on the spike roll skill in sepak takraw.

**Table 1.** description of power tungkai

		N	Mean Rank	Sum of Ranks
Method (TJ:1; SH;2) - Leg Muscle Power (K:1; L;2)	Negative Ranks	10 <sup>a</sup>	10.5	105
	Positive Ranks	10 <sup>b</sup>	10.5	105
	Ties	20 <sup>c</sup>		
	Total	40		

a. Method (TJ:1; SH;2) < Leg Muscle Power (K:1; L;2)

b. Method (TJ:1; SH;2) > Leg Muscle Power (K:1; L;2)

c. Method (TJ:1; SH;2) = Leg Muscle Power (K:1; L;2)

	N	Mean	Std. Deviation	Minimum	Maximum
Leg Muscle Power (K:1; L;2)	40	1.5	0.50637	1	2

Method (TJ:1; SH:2)	40	1.5	0.50637	1	2
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**Test Statistics<sup>a</sup>**

	Metode (TJ:1; SH:2) - Power Tungkai (K:1; L:2)
Z	.000 <sup>b</sup>
Asymp. Sig. (2-tailed)	1.000
a. Wilcoxon Signed Ranks Test	
b. The sum of negative ranks equals the sum of positive ranks.	

**Figure 2.** result of wilcoxon signed ranks test**Table 2.** result of interaction analysis

Dependent Variable: Smash Gulung					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	371.075	3	123.692	48.987	0
Intercept	2907.025	1	2907.025	1151.297	0
X2	119.025	1	119.025	47.139	0
X1	126.025	1	126.025	49.911	0
X2 * X1	126.025	1	126.025	49.911	0
Error	90.9	36	2.525		
Total	3369	40			
Corrected Total	461.975	39			

a. R Squared = .803 (Adjusted R Squared = .787)

**4. Conclusion**

Based on the results above, it can be concluded that: 1) There is a significant difference between the random and random block training methods on the roll spike ability in sepak takraw. The random training method is more effective than the random block method; 2) There is a difference in the effect between strong leg muscle power and weak leg muscle power on the roll spike ability in sepak takraw. Athletes with strong leg muscle power are more effective than athletes with weak leg muscle power; 3) There is an interaction between the training method and leg muscle power on the roll spike ability in sepaktakraw.

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