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## **The Effect of Leg Muscle Strength Training on Side Kick Speed in FIKK UNM Pencak Silat Athletes**

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**A.** Conception and design of the study; **B.** Acquisition of data;  
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### **ABSTRACT**

This research is an experimental study that aims to determine the difference in the effect of leg muscle strength training on sickle kick speed in Pencak Silat FIKK UNM athletes. The population in this study was 20 athletes, random sampling was used, so the sample used was 20 athletes. The data analysis technique in this research is that the data from the test results in this research is quantitative data which will be analyzed descriptively using computerization. The results of the study are the results of the calculation of the normality test for the Leg Muscle Strength Training Group on Sickle Kick Speed Pencak Silat FIKK UNM Athletes. The results are based on the problem formulation which can be described as follows: 1). Leg muscle strength training has a significant effect on the speed of sickle kicks Pencak Silat FIKK UNM Athletes. 2). There is a significant difference in the effect of leg muscle strength training and no leg muscle strength training or the control group on sickle kick speed Pencak Silat FIKK UNM Athletes.

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**Keywords** : Exercise; Leg Muscle Strength; Speed; Side Kick; Martial Arts; Pencaksilat.

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### **INTRODUCTION**

Pencak silat is a traditional martial art that originates from the archipelago, and Pencak silat is part of the Indonesian culture that has developed in line with the history of Indonesian society. The general definition of Pencak silat is a self-defense method created to defend oneself from dangers that can threaten safety and survival. Some say that Pencak silat is a high-level martial movement accompanied by feelings so that mastery of the movements is effective and controlled. Pencak silat is a branch of martial arts rooted in the Malay nation (Hariyanti et al., 2019).

The sport of Pencak silat is a form of self-defense that contains the values of attack and defense. Attacking and defending are things that pencak silat athletes must have, this is what will determine the quality of a pencak silat athlete. Defending, such as dodging, and avoiding the opponent to anticipate the opponent's attack, is the main key in the concept of pencak silat competitions. Apart from that, it is clearly emphasized that the value of attacking is something that must be possessed by pencak silat athletes. In pencak silat movements, it is not only about attacking movements, not just a pencak silat athlete doing



kicks or punches, but what underlies this movement is how a pencak silat athlete can do what and when the type of punch or kick is used.

In pencak silat movements, there are attack and defense movement techniques. There are various attack movement patterns in pencak silat, one of which is the sickle kick. Side kicks can also be called C kicks because the body position twists following the swing from leg to toe, targeting the instep.

According to (Nabila et al., 2021) The side kick movement process in pencak silat sports is carried out with uninterrupted movement patterns so that it becomes a complete series of movements, namely starting from a stance, tilting the body, lifting the leg by kicking at knee height with target the back of the foot and straighten the leg with a quick movement to reach the target on the opponent's body. If the pencak silat movement process is carried out haltingly and irregularly, it can reduce the agility of an athlete carrying out an attack, making it very easy for the opponent to parry or catch him. To produce fast movement speed, foot movement speed is needed as a driving force to help leg movements when swinging (Nabila et al., 2021)

The curved form of the sidekick movement with the impact of the instep requires the athlete's skills to be able to do it correctly so that it can attack the opponent. The sickle movement also uses body twists so that the sidekick is directed at the opponent's stomach and chest. Improving all aspects of physical condition, especially strength in the leg muscles, is the center of sidekick training.

Leg muscle strength is one of the biomotor components that cannot be separated from sports. The strength of the leg muscles, if we look at its role in pencak silat sports, is very important (Dewi & Santika, 2020). Strength is an ability in human physical conditions that is needed to improve movement learning achievement. Strength is an element of physical condition that is very important in exercise because it can help improve components such as speed, agility, and accuracy (Chan, 2012). Physiologically, muscle strength is the ability of a muscle or group of muscles to perform one maximum contraction against resistance or load (Widiastuti, 2015). Strength is the greatest type of force/power produced by a contracting muscle without determining how fast a movement is carried out or how long the movement can continue (Haqiyah & Abidin, 2020).

Pencak silat FIKK UNM itself has pencak silat achievements which are a place for martial artists to develop themselves and practice. Pesilat fighters from achievement coaching are consistent contributors to achievements, especially in the field of Pencak silat from FIKK UNM. Proven by several achievements made by FIKK UNM pencak silat athletes, including the UNM CUP Chancellor's Championship and winning first overall champion and second overall winner, in November 2018 the UIN CUP II championship was held which won first overall champion, the UNHAS CUP Chancellor's championship won overall winner I and overall champion III. And the recent achievements made in November 2019 Pra Pon which was held in Jakarta won 5 medals in the competition event, namely the gold medal won by A. Muh Idham Asyhari class A men, the silver medal won by Ria Hasyim class D women, Bronze medals were won by Muh Yusuf Hanas class C men, Hamry Setawan class D men and Syaiful class F while also qualifying to represent SUL-SEL at the prestigious National Sports Week (PON) which will be held in PAPUA 2020. However, there is an interesting thing that will become a problem for athletes who can win gold medals in the National Championship or PON, this can be because the athlete's physical condition is quite optimal.

## METHODS

The type of research used is experimental. According to (Sugiyono, 2018) the experimental method is a method used to determine the effect of independent variables on the dependent variable. The research was carried out in the laboratory of the Faculty of Sports Science, Makassar State University. The population used in this research was 20 FIKK UNM Pencak silat athletes. According to Arikunto (2006) "the determination of sampling is as follows, if there are less than 100 subjects, it is better to take all of them so that the research is population research, then if there are more than 100 subjects, between 10 - 15% or 20 - 25% can be taken. Because there were no more than 100 participants, the sampling technique was random sampling, and the sample for this study was 20 FIKK UNM pencak silat athletes who were actively training. Research instruments are tools or facilities used by research in collecting data to make work easier and the results better, in the sense of being careful, complete, and systematic so that they are easy to process (Arikunto, 2013). The instrument used in this research was a test. The test is the athlete's side-kick speed ability. The assessment is based on the number of kicks the athlete performs.

**Table 1**  
Normal sidekick speed assessment

Kategori	Putra
Very Good	> 25
Good	20 – 24
Enough	17 – 19
Less	15 – 19
Very Less	< 14

## RESULTS AND DISCUSSION

### Result

#### Descriptive analysis

Descriptive data analysis is intended to get a general picture of the research data. Descriptive analysis was carried out on data on leg muscle strength, and the control group on sidekick speed in FIKK UNM Makassar Pencak Silat Athletes. Descriptive analysis: total value, average, range, maximum, and minimum data from these statistical values is expected to provide a general picture of the state of leg muscle strength training data on side kick speed in FIKK UNM Pencak Silat Athletes. The results of the descriptive analysis of each research variable can be seen in Table 2:

**Table 2.**  
Hasil Analisis deskriptif tiap variabel

	Pretest leg muscle strength training	Post-test leg muscle strength training	Pre-test control group	post-test control group
N	10	10	10	10
Sum	203.00	264.00	139.00	183.00
Mean	20.3000	26.4000	13.9000	18.3000
Std. Deviation	1.41814	1.07497	1.19722	1.33749
Range	4.00	3.00	4.00	4.00
Minimum	19.00	25.00	12.00	16.00
Maximum	23.00	28.00	16.00	20.00

### Data Normality Testing

One of the assumptions that must be met so that parametric statistics can be used in research is normal magnitude strength data. To determine the magnitude of data on leg muscle strength and the control group, regarding side kick speed in FIKK UNM Pencak Silat Athletes, the data normality was tested using the Kolmogorov Smirno (KS-Z) test. The results of the data normality analysis can be seen in the following summary in Table 3:

**Table 3.**

Normality test results for each research variable. Effect of Leg Muscle Strength Training on Side Kick Speed in FIKK UNM Pencak Silat Athletes

Variable	Pretest leg muscle training	Pretest control group
N	10	10
Test Statistic	0.220	0.174
Asymp. Sig. (2-tailed)	0.185	0.200
Point Probability	0.000	0.000

### Sample homogeneity testing

Furthermore, initial test data between the leg muscle strength training group and the control group in this study were collected, so before carrying out inferential statistical analysis for hypothesis testing, the sample homogeneity requirements were tested using the Levene Statistical Test. From the data obtained from the results of the Levene Statistical Test carried out, the results obtained are as summarized in the following table:

**Table 4.**

Sample homogeneity test results Effect of Leg Muscle Strength Training on Side Kick Speed in FIKK UNM Pencak Silat Athletes

Pre-Test	Levenan Statistic	Sig.	A	Information
Leg Muscle Training Group and Control Group	0.654	0.429	0,05	Homogenous

In testing sample homogeneity, the calculations of which are listed in the summary above, the Levene Statistical Test was used at a significance level of 95%. From the results of these calculations, the Levene Statistics Test value is 0.654 with a probability level of 0.429 which is greater than the value  $\alpha = 0.05$ . Therefore, from the results of these calculations, it can be concluded that the two training groups, namely leg muscle strength training and the control group were homogeneous.

### Inferential analysis

To determine the effect of the independent variable on the dependent variable from testing the hypothesis, a paired T-test (Paired Sample T-test) and an unpaired T-test (Independent Samples T-test) were carried out on leg muscle strength data on side kick speed in FIKK UNM Pencak Silat Athletes.

### There is an influence of leg muscle strength training on side kick speed in FIKK UNM Pencak Silat Athletes.

The data obtained from the research aims to determine the independent and dependent variables and prove the existing hypothesis. Therefore, the results of data processing hypothesis testing through paired T-test analysis (Paired Samples Test) from the SPSS program regarding the influence of leg muscle strength and side kick speed in FIKK UNM Pencak Silat Athletes were obtained. The results of the analysis can be summarized in the following table:

**Table 5.**

Results of the first hypothesis analysis of research data on the Effect of Leg Muscle Strength Training on Side Kick Speed in FIKK UNM Pencak Silat Athletes

t <sub>observasi</sub>	t <sub>table</sub>	Probability	Information
11,158	2,262	0,000	Signifikan

The results of Table 5 show that the observation value = 11.158 > t-Table = 2.262 at the 95% significance level ( $\alpha = 0.05$ ). So  $H_0$  is rejected and  $H_1$  is accepted, meaning there is a difference between the initial test and the final test of the group given leg muscle strength training on side kick speed in FIKK UNM Pencak Silat Athletes. So there is a significant influence of leg muscle strength training on side kick speed in FIKK UNM Pencak Silat Athletes.

**There is an influence without training on leg muscle strength or control group on side kick speed in FIKK UNM Pencak Silat Athletes.**

The data obtained from the research aims to determine the independent and dependent variables and prove the existing hypothesis. Therefore, the results of data processing hypothesis testing through paired T-test analysis (Paired Samples Test) from the SPSS program regarding the influence of leg muscle strength and side kick speed in FIKK UNM Pencak Silat Athletes were obtained. The results of the analysis in the research attachment can be summarized in the following table:

**Table 6.**

Results of the second hypothesis analysis of research data. The Effect of Leg Muscle Strength Training on Side Kick Speed in FIKK UNM Pencak Silat Athletes

t <sub>observes</sub>	t <sub>table</sub>	Probability	Information
6,410	2,262	0,000	Signifikan

The results of Table 6 show that the t-observation value = 6.410 > t Table = 2.262 at the 95% significance level ( $\alpha = 0.05$ ). So  $H_0$  is rejected and  $H_1$  is accepted, meaning there is a difference in the initial test and the final test without leg muscle strength training or a control group on side kick speed in FIKK UNM Pencak Silat Athletes. The conclusion is that there is a significant effect without leg muscle strength training or the control group on side kick speed in FIKK UNM Pencak Silat Athletes.

**There is a difference in the influence between leg muscle strength training and no leg muscle strength training on side kick speed in FIKK UNM Pencak Silat Athletes.**

The data obtained from the research aims to determine the independent and dependent variables and prove the existing hypothesis. Therefore, the results of data processing hypothesis testing through unpaired T-test analysis (Independent Samples T-test) from the SPSS program regarding the influence of leg muscle strength on side kick speed in FIKK UNM Pencak Silat Athletes were obtained.

**Table 7.**

Results of the analysis of the third hypothesis of research data. The Effect of Leg Muscle Strength Training on Side Kick Speed in FIKK UNM Pencak Silat Athletes

t <sub>observasi</sub>	t <sub>table</sub>	probability	Information
14,927	2,101	0.000	Signifikan

The results of Table 7 show that the observation value = 4.562 > tTable = 2.101 at the 95% significance level ( $\alpha = 0.05$ ). So  $H_0$  is rejected and  $H_1$  is accepted, meaning there is a difference between the two leg muscle strength training groups and the group without leg muscle strength training or the control group regarding the side kick speed of the FIKK UNM pencak silat athletes. From the Anofa test or F test. The calculated F was 0.654 with a significance level of 0.000. Therefore the probability (0.000) is much smaller than  $\alpha 0.05$ , so the regression model can be used to predict the speed of side kicks (can be treated for the population where it is taken). The conclusion is that there is a significant difference in the effect between leg muscle strength training and no leg muscle strength training or the control group on side kick speed in FIKK UNM pencak silat athletes.

## Discussion

### **There is an influence of leg muscle strength training on side kick speed in FIKK UNM Pencak Silat Athletes**

The results of the statistical analysis show that there is a significant influence of leg muscle strength on side kick speed in FIKK UNM Pencak Silat Athletes. If the research results are linked to the underlying theory and framework of thought, then basically the results of this research support and strengthen the theory of previous research results. which already exists. Therefore, the athlete's leg muscle strength will be very helpful in the movements needed when performing a side kick. Because strength is the basic foundation in every movement in the sport of pencak silat. From a physiological perspective, when performing a side kick, the muscles that move or contract, such as the hamstring group, vestus medialis, vestus lateralis, will participate when performing a side kick. Likewise, the muscles in the lower legs such as the gastronimus, tibialis anterior, pronous longus will contract maximally according to the mechanism of the side kick movement in pencak silat sports. The muscle vibrils when performing a side kick all contract simultaneously in a very short period of time to produce a side kick in pencak silat sports. The side kick is a kick that is very effective in scoring points and is often used as a counterattack after successfully dodging an opponent's attack. To be able to perform a side kick optimally, you need to master the correct technique, choose the right target, and a kick trajectory that suits the body's anatomy.

### **There is an influence without leg muscle strength training or a control group on side kick speed in FIKK UNM Pencak Silat Athletes**

The results of static analysis show that there is a significant influence on flexibility and side kick speed in FIKK UNM Pencak Silat Athletes. If the research results are linked to the underlying theoretical framework of thinking, then basically the results of this research support and strengthen the theory from the results of existing previous research. Regular exercise will cause physiological changes in the muscles. This really depends on training habits in the sense that side kick speed will still be created if structured training is given every day, even if only as a comparison in the training program. Because physiologically, the muscle groups that contract are the same, namely the hamstring group, vestus medialis, vestus lateralis, ilopsoas and the gluteus maximus muscle group, while the lower leg muscles are the gastronimus, tibialis anterior, pronous longus and solesus. Anatomically, the trajectory of the side kick must be taken into account so that it does not conflict with the body's anatomical movements so that the kick can be executed optimally. Thus, if you practice side kicks all the time, it will still have a positive effect on the speed of side kicks in pencak silat sports.



## **There is a difference in the effect of leg muscle strength training and no leg muscle strength training or control group on side kick speed in FIKK UNM Pencak Silat Athletes**

The results of the static analysis show that there is a significant influence of the control group on side kick speed in FIKK UNM Pencak Silat Athletes. If the results of this research are linked to the underlying theoretical framework of thought, then basically this research supports the results of existing previous research. As a researcher, control groups are very important in developing athletes. So that the program for athletes shows the changes that are created, whether the changes come from loading from the training program or changes created from consistent training habits. The essence of leg muscle strength is an important biomotor component in sports, especially in pencak silat. Leg muscle strength plays a key role in this sport, especially seen in the stances that are often used in movements in pencak silat. Before carrying out a dodge or attack, each fighter will position their body into a stance, which requires leg muscle strength to support the body weight properly. Apart from supporting body weight, leg muscle strength is also important in the dodging process and in kicking, leg muscle strength is the muscle's ability to overcome loads and resistance with very high contraction speeds. Leg muscle strength is a combination of two abilities, namely strength (strength) and speed (speed), where maximum strength and speed are exerted in a very fast and short time for athletes. The position in performing a side kick is that one leg kicks to the side so that one foot rest together to lift.

## **CONCLUSION**

In accordance with the results of the analysis of hypothesis testing based on the problem posed, the following conclusions can be drawn:

1. Leg muscle strength training has a significant effect on side kick speed in FIKK UNM Pencak Silat Athletes.
2. There is a significant difference in the effect of leg muscle strength training and no leg muscle strength training or the control group on side kick speed in FIKK UNM Pencak Silat Athletes.

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