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The Effect of Resistance Band Training on T-Kick Speed in Pencak Silat Sports at Pelatda 143 Tapak Suci Kuningan

Muhammad Bintang Putranto[1], Ribut Wahidi[2]

[1,2] Physical Education Health and Recreation Study Program, Universitas Muhammadiyah Kuningan, Jl. Raya Cigugur No.28 Kec.Kuningan Kab. Kuningan, Jawa Barat, 45511, Indonesia

Abstract
This research aims to determine the effect of resistance band training on t-kick speed in pencak silat sports at Pelatda 143 Tapak Suci Kuningan. The method used is an experiment with a pretest and posttest design. The pretest results showed that the speed ability in performing the athlete's t-kick was still classified as poor, with the lowest value of 18 and the highest of 24. After being given treatment in the form of resistance band training, the post-test results showed an increase in pencak silat t-kick speed, with the lowest value of 25 and the highest of 32. Data analysis was carried out through a normality test using the Shapiro-Wilk test with the help of the SPSS IBM-21 program, which showed a significance value of 0.330> 0.05, so the data was declared normally distributed. Furthermore, hypothesis testing using the paired sample test shows significant results with a sig. (2-tailed) value of 0.000 <0.05. Based on these results, it can be concluded that there is a significant effect of resistance band training on t-kick speed in pencak silat sports at Pelatda 143 Tapak Suci Kuningan.

Keywords: *Kick, Speed, Pencak Silat, Resistance Bands*

Correspondence author: Muhammad Bintang Putranto, Universitas Muhammadiyah Kuningan, Indonesia.
Email: bintanggarawangi@gmail.com

INTRODUCTION

Sport is generally defined as a physical and mental act that helps maintain and improve health. Many things are related to sports, from victories, defeats, championships, trophies, medals, pride, to disappointments, failures, conflicts, and riots. All that indicates a great passion for sports is the result of all the interconnected things in the sport itself (Aditia, 2015). In addition, sport is also one of the activities that teach many things, ranging from honesty in playing, respecting friends and opponents, accepting defeat gracefully, congratulating the winner, being fair play in playing, and upholding the degree of sportsmanship in playing and many more positive things that are actually contained in the sport.

Exercising is one way to improve the quality of the individual himself through his physique by improving character and personality, discipline, and sportsmanship, as well as increasing achievements that can foster a sense of pride for himself and for others as well. Sport is also an

effort to strengthen a person's spiritual and physical. Physical activity such as exercising is a competitive activity motivated by personal satisfaction and profit from others that involves heavy physical exertion or the use of relatively complex physical skills (Millah et al., 2018).

In accordance with the title and discussion of scientific papers taken by the author, the topic of discussion taken is the branch of martial arts, namely Pencak Silat Martial Arts. Martial arts can be defined as a sport that combines physical activity with elements of art, self-defense techniques, exercise, and mental exercise. The fact that martial arts is a form of sport is a tool to seek brotherhood has evolved into a broader purpose. Now, the purpose of people studying martial arts among others is to excel as athletes through martial arts sports (Saputra et al., 2018).

The characteristics and definition of martial arts sports are fights between two people without using any weapons where the fighters rely on the physical strength, technique and ingenuity of the fighters themselves in accordance with the rules and regulations of the competition from the martial arts sport itself or also in the form of fights or self-defense using punches, kicks, grappling, dodges, blocks, and slams (Wali & Widiyanto, 2020).

Pencak silat is a tradition that originated from the ancestors of the Indonesian people and is one of the cultural arts of the Indonesian people. Pencak silat is the strongest Indonesian culture that has been passed down by the ancestors of the Indonesian people. Pencak silat warriors and experts argue that martial arts have been created and used by the Malay people since prehistoric times. In prehistoric times, humans had to face difficult environments and fight wild animals and other human groups when fighting for food to survive. Initially, pencak silat functioned as a tool for self-defense from various threats but along with its development, the function of pencak silat is not only as a means of self-defense but also as a means of sports, a means of devoting love to aspects of beauty (aesthetics), and a mental and spiritual education tool that pencak silat is a sport that is complete enough to be studied because it has four aspects which are a whole and cannot be separated, namely spiritual aspects, martial arts aspects, sports aspects and cultural arts aspects. (Guntur Sutopo & Misno, 2021).

Movement skills in the sport of pencak silat include kicks, parries, punches, dodges and falls. Each technique has its own function and use. Kicking is one of the attack techniques in the sport of pencak silat which has a high enough value and is one of the techniques often used in pencak silat matches, the kicking technique has a large enough percentage in an attacking position,

reaching 47% (Hariono et al., 2017). One of the kicking techniques that will be discussed by the author in this study is the T kick.

According to Zainul Johor in (Mustain & Akbar, 2021) "Kicking is a kicking movement to insert power towards the opponent's front body. When kicking, the thigh will be raised in a flat position, accompanied by the right shape and trajectory. One foot will stand or rest, so good balance is needed. In order for the kick to be successful and go in, a high speed is required when doing so.

T kick is one type of kick in pencak silat which is done by directing the foot to the side, controlling the hips, and using the sole of the foot as a cushion and the final position is like forming the letter T. To carry out the T kick technique, speed, strength, and especially good balance stability are needed. According to Lubis in the journal (Efendi & Zulrafli, 2024) T kick is a form of kick movement that lifts one leg and directs straight sideways to the target using the targeting tool on the outside of the sole of the foot. For success in performing the T kick movement, strength, speed, coordination and stable body balance are needed.

The T kick is one of the kicks that is very often used by athletes in every match, because the T kick is widely used by martial arts athletes to get as many points as possible, to be able to perform the T kick technique, an athlete must have a good level of physical fitness. The basic kicking technique, especially the T kick in pencak silat, is required to have speed and strength in its implementation, because speed and strength are the producers of hard explosions in kicks from pencak silat athletes.

Success in performing T kick movements requires good and strong physical condition components, one of which is speed. Speed is very important and can have an impact on the performance of a martial arts athlete when competing, both when attacking and when defending. Speed is one of the components of physical fitness that is very important and vital in sports achievements, one of which is in the sport of pencak silat. Motor ability represents a form of proficiency in mastering various fundamental skills and engaging comprehensively in a wide range of physical activities (Tarju & Wahidi, 2017).

According to Ismartanti, Speed can be defined as the ability to move with the efficiency and power of motion that allows the highest level of speed to be achieved. This includes the ability to optimize the capacity of physical condition components and conditions so that the process of movement or change takes place in the shortest possible time, taking into account physical

limitations or external factors that affect it. Moh. Gilang said that "Speed is the ability to perform consecutive similar movements in the shortest possible time or the ability to cover a distance in the shortest possible time" (Pratiwi et al., 2013).

Based on the above statement, it can be concluded that speed is an important factor in supporting the success of doing a T kick well. Therefore speed is one of the factors that has an important role in pencak silat matches, therefore every movement of the T kick technique in pencak silat must be done quickly so that the opponent does not have the opportunity to avoid, evade, catch and reply or commonly referred to as the speed of movement (Mustain & Akbar, 2021).

The development of technological media in the form of resistance bands in a variety of exercises in martial arts makes this tool very popular with sports players including martial arts athletes. Resistance bands are a very effective training tool for improving various aspects needed in martial arts, especially in training kicks. Resistance bands with their ability to provide additional resistance, resistance bands help athletes develop the muscle strength, speed, agility, flexibility, and balance needed in martial arts kicking techniques.

The speed and strength of the leg muscles in performing the T kick technique in pencak silat as a whole can be significantly improved by doing exercises using resistance bands. The use of resistance bands in this exercise can help optimize muscle strengthening and increase endurance and speed of movement which are essential in mastering the T kick technique more effectively and efficiently (Aldi & Mulyana, 2024). Resistance bands are lightweight elastic exercise tools made of rubber that are used for muscle strengthening and mobilization. Resistance bands help target all types of muscle groups to get full muscle engagement to ensure effective exercise (Ningsih & Hasanudin, 2023).

According to Frank in (Ali et al., 2022), where the combination of Resistance Band training is very effectively used to increase jump height and leg strength, increase speed and agility. Based on the explanation above, it can be concluded that the Resistance Band is a tool that is easy to carry and can be used anywhere and has many benefits such as increasing muscle, increasing speed and agility.

According to Martens in the journal (Nabila et al., 2021) states that kick speed can be increased using weight training, namely by training the spring force elasticity properties of inner tube rubber. Rubber resistance is a training aid that can be used to increase kick speed because resistance training can increase speed. According to (Rasyono, 2018) Rubber weight training will

train leg muscle contractions, during rubber weight training the muscle contraction that occurs is isokenetic muscle contraction. According to (Suprapto et al., 2019) to increase leg muscle power in T kick speed, athletes need a total training time of 18 meetings with a frequency of 3 times a week. In the variation of resistance band training, researchers use several variations of t-kick movements with resistance band equipment, namely;

1) Static T-kick with resistance band
2) Explosive T-kick with resistance band
3) Multiple T-kick with resistance bands

Rubber weight training has many benefits in improving speed, and muscular endurance strength. One of them is to train muscle contraction in an effective way. During rubber weight training, the type of muscle contraction that occurs is isokenetic muscle contraction. Isokenetic contraction itself refers to muscle contraction that occurs at a constant speed, where the muscle contracts maximally with each movement. In this case, the muscle works with optimal strength, but at a steady pace throughout training and competition. This type of muscle contraction is very important, as it occurs during pencak silat training and matches can provide a useful stimulus for muscle development and overall physical performance. E.I. Fox, stated that the strength gain from an 8-week isokenetic training program, 3 times per week, was 30%. It was also reported that isokenetic training programs should take into account the factor of angular velocity of motion in the joints (Rasyono, 2018)

Isokenetic muscle contractions are maximal muscle contractions at a constant rate, this occurs during physical activity. Since isokenetic exercise programs are new, not many researchers have provided complete information (Efendi & Zulrafli, 2024). According to Prawirasputra in (A. Maulana & Wijaya, 2018) rubber weight training is a form of resistance training to increase muscle strength, while according to Harsono in (A. Maulana & Wijaya, 2018) states that: This resistance exercise must be carried out in a way that allows athletes to expend all their energy to hold the weight. To ensure muscle development, the load gradually increases in weight or volume. Weight training, also known as weight training, is a systematic process that uses weights to increase muscle strength to achieve specific goals, such as improving physical condition, health, strength, speed, and performance in certain sports.

Based on the above statement, that when one of the component elements of an athlete's physical fitness is speed and then combined with strength, it will produce an attack in the form of

a perfect and good T kick technique when competing, from the reality that exists in Pelatda 143 Tapak Suci Kuningan where athletes are still unable to perform T kick speed well. It can be concluded that T kick training using resistance band equipment can be effective in increasing T kick speed and muscle strength and endurance, so that the speed in performing T kicks can reach maximum conditions when practicing and competing. Therefore the authors are interested in examining the effect of resistance band training on T-kick speed in pencak silat sports at pelatda 143 tapak suci kuningan.

METHOD

The research method is a matter that must be planned before going directly to the field. The research method is a scientific way to obtain valid data with the aim of being able to find, develop, and prove, a certain knowledge so that in turn it can be used to understand, solve, and anticipate a problem and also (Sugiyono, 2020) explains that "The research method is basically a scientific way to get data with specific purposes and uses". Every research carried out certainly requires a method, the success or failure of a study depends on the method used. In this study using a pre-experiment method with a type of quantitative research in this study there is one group and compares the pretest results with the posttest results. The design used in this research is One Groups Pretest-Posttest Design (Aji Pamungkas, 2022).

Table. 1 Resistance Band Training Program

Meeting	Training Method	Set	Repetition	Intensity	Recovery/Repetition	Duration/ Repetition
1-6	1. Static T-Kick with resistance band 2. Explosive T-Kick with resistance band 3. Multiple T-Kick with resistance band	3	5	50%	30-60 seconds	15 seconds
7-12	1. Static T-Kick with resistance band 2. Explosive T-Kick with resistance band 3. Multiple T-Kick with resistance band	4	5	70%	80 seconds	15 seconds
13-18	1. Static T-Kick with resistance band 2. Explosive T-Kick with resistance band 3. Multiple T-Kick with resistance band	2	10	95%	120 seconds	15 seconds

Table. 2 Demonstration Example

No	Training Program Methods	Demonstration Example	Description
1	Static T-Kick with resistance band		The athlete prepares in the final position of the T kick technique with the resistance band attached to both feet and then maintains the movement for 15 seconds.
2	Explosive T-Kick with resistance bands		The athlete prepares in a forward line stance with both feet already attached to the resistance band, then lifts the back leg with the support of the front leg then continues with the final stance of the T kick technique repeatedly as soon as possible for 15 seconds.
3	Multiple T-Kick with resistance band		The athlete prepares in a forward-line stance with both feet already attached to the resistance band, then lifts the front leg with the support of the back leg and then continues the final stance of the T kick technique repeatedly in chains as fast as possible for 15 seconds.

The sampling technique in this study used purposive sampling technique, namely Pelatda 143 Tapak Suci Kuningan athletes as many as 10 people from a total population of 20 people. In this study using test instruments, the measuring instrument used in this research instrument is the pencak silat kick speed measurement test, the validity and reliability coefficient value through the sample of national training athletes from 1999 to 2005, with a reliability value of 0.87 and content validity with face validity. (Lubis & Wardoyo, 2016:200)

1. Pencak silat kick speed test
   a. Goals:

      The goal of the T-kick speed test is to determine the ability of T-kick speed in pencak silat athletes at Pelatda 143 Tapak Suci Kuningan.

   b. Equipment used:
      1. *Sandsack (50 kg expected)/peching box*
      2. Meter tool
      3. Stopwatch
   c. Measurement officer:
      1. Sandsack height gauge/target peching boxPencatat waktu
      2. timekeeper
      3. Sandsack guard/target peching box
   d. Implementation:

      Athletes get ready to stand behind the sandsack/target peching box with both feet in the middle of the line. On the signal 'Yes' the athlete performs a right T kick by jumping where the left foot as the fulcrum foot is next to the right line, then performs to the left side with the right foot as the fulcrum foot next to the left line as much as possible for 15 seconds. The implementation was carried out 3 times and the best time was taken with the target height of the sandsack/peching box with a height of 75 cm (women) and 100 cm (men). The distance between the target and the target is 200-210 cm to the left and right of the fighter.

   e. Assessment:

      Score based on the fastest time of the athlete's performance

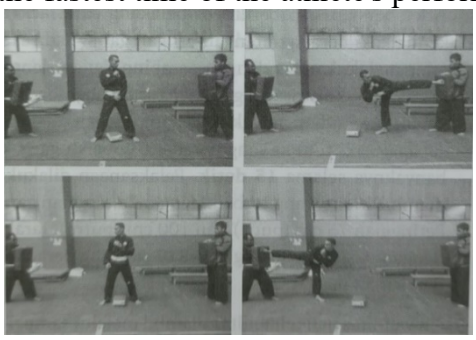

Figure 1. Implementation of the T kick speed measurement instrument
Source: (Book: Pencak Silat: Third Edition, 2016: 202)

Table 3. Assessment category of T pencak silat kick speed
Source : (Arif et al., 2021)

Category	Women	Men
Excellent	>28	>30
Good	23-27	25-29
Fair	18-22	20-24
Less	14-17	15-18
Very Less	<13	<14

The process of obtaining information about the speed of the t-kick in pencak silat sports is carried out by the test and measurement method carried out in the initial test (O_2 as pretest) and the final test (O_2 as posttest). The data collected is then analyzed statistically to see if there are significant changes in athletes in performing t-kick speed before and after using resistance band training. The stages of data analysis include: first, the data normality test uses the Shapiro-Wilk test to ensure that the data is normally distributed, with the criteria that if the p value is greater than 0.05 then the distribution is declared normal. Second, a homogeneity test was conducted using Levene's test to ensure that the variance in each group was the same or similar, with the criterion that if the sig value was greater than 0.05 then it was declared homogeneous. Finally, to test the significance of the difference between pretest and posttest results, the paired sample t-test was used, because this analysis compares the difference between pretest and posttest in the same group of subjects.

RESULTS AND DISCUSSION

Result

This study aims to analyze the effect of resistance band training on t-kick speed in pencak silat sports at Pelatda 143 Tapak Suci Kuningan. Data on the ability of pencak silat t-kick speed was collected through an initial test (pretest) before intervention and a final test (posttest) after the implementation of resistance band training for 18 meetings.

The complete data regarding the results of the pretest and posttest of t-kick speed in pencak silat sports at Pelatda 143 Tapak Suci Kuningan are presented in the following table;

A. Results of Data Analysis of Pretest and Posttest T-Kick Speed in Pencak Silat

Table. 4 Pretest and Posttest Results of Pencak Silat T-Kick Speed

NO	NAME	PRETEST	POSTTEST
1	Nanda Firmansyah	24	32
2	Giwang Purnama	20	25
3	Riki Abdul Rohman	23	30
4	M Lutfi Septyansyah	24	28
5	Maulana Revaldi	21	27
6	Yandi Nugraha	18	25
7	M Rafli Firdaus	20	26
8	Robi Robiyansyah	18	25
9	Hafiz Abidin	23	29
10	Bagus Akhsanu Amalan	23	28
Total pretest result		**214**	
Pretest mean		**21.4**	
Total posttest results		**275**	
Posttest mean		**27.5**	

Based on table. 2 that the pre-test results before using resistance band training for T-kick athletes are still lacking in speed when doing martial arts T-kick, it can be seen in the mean pretest results of 21.4 athletes. While the posttest results that have been given a t-kick training program using resistance band equipment, athletes experience a good increase in the speed of the martial arts t-kick which can be seen from the mean posttest results of 27.5.

B. Descriptive Statistics

Table. 5 Descriptive Statistics Results

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	10	18	24	21.40	2.319
Posttest	10	25	32	27.50	2.369
Valid N (listwise)	10				

Based on the table. 3 descriptive analysis of statistics on pretest and posttest research on pencak silat kick speed measurement tests on pencak silat sparring athletes at Pelatda 143 Tapak Suci Kuningan obtained a minimum pretest value = 18, maximum value 24, average (mean) = 21.4, with a standard deviation = 2.319, while for the value of the posttest the minimum value = 25, maximum value = 32, average (mean) = 27.5, with a standard deviation = 2.369.

Based on the explanation above, it can also be seen that when compared to the average results of the pre-test and post-test, which means that there is a change in the increase in the speed of martial arts kicks on athletes at Pelatda 143 Tapak Suci Kuningan when before and after being given treatment in the form of resistance band training for 6 weeks with a frequency of 3 times per week for a total of 18 meetings.

C. Description of Categorization Data

Table. 6 Category Result
Pencak Silat T-Kick Speed Test Categories

No	Category	Description Score	Frequency	Relative frequency (%)
1	Excellent	>30	2	20%
2	Good	25-29	8	80%
3	Fair	20-24	0	%
4	Less	15-18	0	%
5	Very Less	<14	0	%
Total			10	100%

Based on the table. 4 above obtained the level of the category of T-kick speed test for Pelatda 143 Tapak Suci Kuningan silat athletes, namely 2 people (20%) declared excellent, 8 people (80%) declared good.

D. Normality Test

Table. 7 Normality Test Results

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
Nilai	Pretest	.255	10	.065	.875	10	.114
	Posttest	.154	10	.200*	.917	10	.330
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

From the results of table. 5 above it can be seen that the pretest data has a p (sig) value of 0.114> 0.05, then the posttest data has a p (sig) value of 0.330> 0.05, therefore it can be concluded that the data obtained in this study is normally distributed. This can be seen from the basic formula for decision making in the Shapiro-Wilk normality test.

E. Homogenity Test

Table. 8 Homogenity Test Result

Test of Homogenity of Variances

Nilai			
Levene Statistic	df1	df2	Sig.
.039	1	18	.845

Based on table. 6, it can be seen that the significance value based on one mean is 0.845 or (sig) > 0.05, so it can be concluded that the value of the pretest and posttest data variants of resistance band training on t-kick speed in pencak silat sports at Pelatda 143 Tapak Suci Kuningan is homogeneous or the same.

F. Hypothesis Test

Table. 9 Hypothesis Test Result

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-6.100	1.197	.379	-6.956	-5.244	-16.112	9	.000

The results of table 7 above show that the significance results (2-tailed) with a value of 0.000. Therefore, if the significance is smaller than the basic decision-making formula (0.000 <0.05), it can be concluded that there is a significant effect so that h_0 is rejected and h_a is accepted.

Discussion

The results of this study significantly show that resistance band training on t-kick speed in pencak silat sports at Pelatda 143 Tapak Suci Kuningan is effective in improving the ability of pencak silat t-kick speed in athletes. This is evidenced by the results of hypothesis testing with the results of Sig. (2-tailed) = 0.000 <0.05. This increase can be attributed to the use of resistance

bands in this exercise can help optimize muscle strengthening and increase endurance and speed of movement which are essential in mastering the T-kick technique more effectively and efficiently. (Aldi & Mulyana, 2024)

This research is also in line with Frank's opinion in (Ali et al., 2022), where the combination of Resistance Band training is very effectively used to increase jump height and leg strength, increase speed and agility. According to Martens in the journal (Efendi & Zulrafli, 2024) stated that kicking speed can be increased using weight training, namely by training the spring force elasticity properties of inner tube rubber.

This finding is also consistent with previous research by M. Ilham Furqoni Efendi and Zulrafli in 2024 and research conducted by Azlan Ali, Muhammad Salabi and Jamaludin in 2022 which also reported significant results that resistance band training can have a positive impact on the ability of pencak silat t-kick speed in Pelatda 143 Tapak Suci Kuningan athletes. This research makes a specific contribution in the context of the ability of athletes' pencak silat t-kicks, which previously had many deficiencies in t-kick speed. However, it should be noted that there are variations in resistance band training to increase the speed of the t-kick of each individual athlete which may be influenced by motivational factors, emotional conditions and athlete adaptation to training methods where the abilities possessed by each athlete are different.

The main limitation of this study is the exclusion of a control group, so the interpretation of performance improvement as being entirely attributable to resistance band training needs to be done carefully and critically. The findings have important implications in that coaches can integrate the use of resistance bands as a primary training method as well as an effective and efficient variation in structured training programs to improve the speed of T kicks in athletes.

Future research is recommended to use a design that includes the presence of a control group and examines other individual variables, in order to gain a deeper understanding and increase the generalizability of the research findings.

CONCLUSION

Based on data analysis and discussion, it can be concluded that resistance band training in pencak silat sports has a significant effect in increasing the speed of t-kick in pencak silat sports at Pelatda 143 Tapak Suci Kuningan. This is evidenced by an increase in the average t-kick speed value from a value of 21.40 in the pretest to 27.50 in the posttest, from the results of the paired sample t-test test showing a significance value of 0.000 (Sig. (2-tailed) <0.05), which indicates a

significant difference before and after treatment. Therefore, the resistance band training method in pencak silat is proven to be effective in improving the ability of t-kick speed in athletes, not only from the aspect of kick speed, but also from the aspect of strength and endurance of leg muscles in athletes.

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