



The Effect of Core Stability Training Variations on Crescent Kick Speed in Pencak Silat Athletes at SMPN 29 Medan

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ABSTRACT

This study aimed to investigate the impact of core stability training variations on the speed of the crescent kick among Pencak Silat athletes from the Lapan Penjuru club at SMPN 29 Medan in 2024. Lapan Penjuru is a dedicated Pencak Silat training program integrated into the school. The research employed an experimental method using a one-group pretest-posttest design. The population consisted of 20 student-athletes, from which 8 participants were selected through purposive sampling. The training intervention was conducted over six weeks, with sessions held three times a week. Data analysis using a paired-sample t-test revealed a calculated t-value (t_o) of 10.93, which exceeds the critical t-table value of 1.89 at a significance level of $\alpha = 0.05$ with 7 degrees of freedom. These results led to the rejection of the null hypothesis (H_o) and the acceptance of the alternative hypothesis (H_a). Therefore, it can be concluded that variations in core stability training have a significant positive effect on improving crescent kick speed among Pencak Silat athletes at SMPN 29 Medan.

Keywords: Core Stability Training, Crescent Kick, Pencak Silat, Performance Enhancement, Martial Arts

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INTRODUCTION

According to Arman Maulana (2018), pencak silat is Indonesia's national martial art. Over the years, it has experienced significant growth and increasing popularity among both the local population and international practitioners. During the 20th century, Pencak Silat evolved into a structured competitive sport governed by the International Pencak Silat Federation (Persekutuan Pencak Silat Antar Bangsa, PESILAT). The global promotion of Pencak Silat by national federations across five continents reflects the ambition to elevate the sport to Olympic status. PESILAT oversees the official international competitions, where only certified practitioners are permitted to participate.

Pencak Silat is generally divided into two main categories: the artistic category and the match (competition) category. The artistic category is further divided into three sub-categories: (1) solo performance, (2) duo performance, and (3) team performance. In the competition category, athletes employ offensive and defensive techniques such as blocking, evading, targeting, and attacking opponents, which require a high level of technical proficiency and physical conditioning.

Technical mastery forms the foundation of athletic performance in Pencak Silat. While physical and mental aspects are also important, a solid command of the basic techniques is essential for success. These fundamental techniques include punching, kicking, blocking, and evasive maneuvers. For optimal performance, such techniques must be executed with precision, speed, accuracy, and coordination.

Among these, kicking techniques hold particular importance in Pencak Silat, as they offer greater reach and yield higher scores in competition. A valid kick scores 2 points, while a punch scores only 1 point. Hence, proficiency in kicking is crucial for competitive success. Several types of kicks are commonly used in Pencak Silat, including back kicks, front kicks, side kicks (also known as T-kicks), and hook kicks. These techniques are not only effective for scoring but also serve as strategic tools to maintain distance and control during bouts. Among them, the hook kick (*tendangan sabit*) is particularly favored in competitive settings due to its dynamic and versatile nature (Sutiono, 2013, p. 2).

The crescent kick is characterized by a semi-circular motion executed from the side, resembling the shape of a crescent or sickle. The point of contact typically involves the instep or the base of the toes (Kriswanto, 2015, p. 71). Among the various kicking techniques in Pencak Silat, the crescent kick is widely regarded as one of the most frequently used and effective during competitive matches. According to Suyudi (2014), the crescent kick involves a dynamic arc-like motion utilizing the back of the foot, accompanied by a 130-degree rotational movement of the supporting leg. Its frequent application in matches underscores the necessity of executing the technique with optimal speed and precision.

To examine the implementation of this technique in the field, the researcher conducted direct observations and interviews at SMPN 29 Medan, located on Jl.

Letda Sujono Ujung, North Sumatra. The school's Lapan Penjuru Pencak Silat Club has produced numerous successful athletes who have competed at various levels, including Popdasu, Porwilsu, and Porprovsu. The club is supervised and coached by Mr. Supriyanto, S.Pd. During field observations on Tuesday, February 20, 2024, the researcher assessed the athletes during the warm-up, main training, and cool-down phases of their workout. Based on these observations and subsequent interviews, it was found that beginner-level athletes at SMPN 29 Medan demonstrated deficiencies in the execution speed of their crescent kicks. This highlighted the need for targeted training interventions designed to improve this specific performance component.

According to Nugroho (2001, p. 95), speed is defined as the ability of a Pencak Silat practitioner to perform a movement in the shortest possible amount of time. Although many novice athletes undergo regular technical training in kicking, optimal performance—particularly in speed—has not yet been fully realized.

To enhance the effectiveness of the crescent kick, athletes should engage in specific training programs that focus on both technical execution and physical conditioning. The crescent kick is especially valuable in Pencak Silat matches due to its simplicity, accuracy, and ability to score points. However, the ability to perform this technique rapidly is essential for its success in competition. As such, improving kick speed requires appropriate training that targets the physical components influencing speed—particularly core stability. Given the importance of core strength and stability in generating explosive movement, this study was designed to investigate the effect of core stability training variations on the speed of crescent kicks among Pencak Silat athletes at SMPN 29 Medan in 2024.

The crescent kick is one of the primary offensive techniques in Pencak Silat, often used to score points and secure victory. However, this technique is not consistently executed at its optimal potential by many athletes, including those from the Lapan Penjuru Pencak Silat Club. In competitive Pencak Silat, speed plays a crucial role in executing kicks, as slower movements increase the risk of being anticipated, blocked, or countered by the opponent. To address this performance gap, the researcher implemented variations of core stability training designed to improve kick speed. According to Kibler et al. (2006), core stability refers to the

ability to control the positioning and motion of the pelvis and lower extremities, thereby optimizing force production and movement efficiency during physical activity. In this study, core stability training was enhanced through the use of resistance bands, which provide elastic resistance and facilitate improvements in explosive speed.

Despite regular practice, many novice athletes at pencak silat schools fail to achieve optimal technical execution. Common limitations include underdeveloped physical attributes, particularly in the lower extremities, and insufficient speed during key techniques, such as crescent kicks. These deficiencies contribute to ineffective offensive and defensive maneuvers, including delayed kicks, inadequate blocking and evasion, and missed opportunities for counterattacks.

To enhance the speed of crescent kicks, athletes can benefit from modified training methods, such as dynamic balance drills and resistance exercises using elastic bands. Resistance bands serve as practical training tools due to their spring-like properties, which help simulate and train the explosive movements required for high-speed kicking. This form of resistance training can be applied not only to Pencak Silat athletes but also to martial artists in general, as it strengthens key muscle groups and improves neuromuscular coordination essential for speed.

Speed is a fundamental physical component in competitive sports and is particularly crucial for athletes seeking to perform at a high level. Within the Lapan Penjuru Club, many athletes have demonstrated difficulty executing fast and accurate crescent kicks. These kicks are often intercepted or blocked by opponents due to inadequate muscular development in the legs, which is linked to suboptimal training methods and insufficient load-specific interventions.

To achieve peak performance in Pencak Silat, athletes must master a range of fundamental techniques. These include striking, kicking, evasion, sweeping, locking, and footwork patterns. Among these, kicking is regarded as a vital offensive strategy and, thus, demands specific attention in training programs.

The primary objective of this research is to investigate whether dynamic balance training, supplemented by the use of rubber tires as training aids, can significantly enhance the speed of crescent kicks among Pencak Silat athletes at SMPN 29 Medan. According to Martens (in Pranata, 2017, p. 108), kicking speed

can be effectively improved through spring-based training methods that utilize the elastic properties of rubber tires to simulate the development of explosive force.

This study holds practical relevance for improving the training quality of Pencak Silat athletes at SMPN 29 Medan. By providing empirical evidence on the effectiveness of dynamic balance and resistance-based training, the findings can inform coaches and practitioners in designing more targeted and effective training programs. Moreover, the study's outcomes are expected to contribute valuable insights into the continuous development of the Lapan Penjuru Club's athlete training strategies.

METHODS

This study employed an experimental approach using a One-Group Pretest–Posttest Design, as proposed by Sugiyono (2001:64), to examine the effect of core stability training variations on crescent kick speed in Pencak Silat athletes from the Lapan Penjuru Club at SMPN 29 Medan. The intervention was conducted over six weeks, comprising a total of 18 training sessions held on Mondays, Wednesdays, and Fridays. The core stability training program consisted of a variety of exercises including jump-to-box, half squat jumps, and high knees specifically designed to enhance the strength and balance of the core musculature.

The population in this study included all male Pencak Silat athletes from the Lapan Penjuru Club at SMPN 29 Medan, totaling eight athletes. A total sampling technique was employed, in which the entire population also served as the study sample. Data collection involved both field testing and direct observation. According to Arikunto (2013:266), "Tests are used to determine whether a variable exists and to what extent it can be measured." In this study, a crescent kick speed test was administered both before the intervention (pretest) and after the intervention (posttest). The test procedure utilized a stopwatch, a target sandbag positioned at a height of 100 cm, and a timekeeper to count the number of valid crescent kicks executed within a 10-second timeframe.

Quantitative data analysis was conducted using a paired sample t-test, following the method outlined by Sudjana (1992, p. 210). A Liliefors test was used to assess the normality of the data. At the same time, an F-test was applied to evaluate homogeneity, ensuring the dataset met the assumptions required for

parametric statistical analysis. The results of the t-test revealed that the calculated t-value ($t_{\text{calculated}} = 10.93$) exceeded the critical value ($t_{\text{table}} = 1.89$) at the 0.05 significance level. This indicates a statistically significant effect of core stability training variations on the speed of the crescent kick. Consequently, the alternative hypothesis (H_a) was accepted, while the null hypothesis (H_0) was rejected.

RESULTS AND DISCUSSION

The subjects of this study were eight male Pencak Silat athletes from SMPN 29 Medan. This research employed an experimental method, with the primary intervention consisting of variations of core stability training. The overall research procedure was systematically divided into three main stages: pretest, treatment, and posttest. In the initial stage, a pretest was conducted to assess the baseline crescent kick speed of the athletes. This was followed by the treatment phase, during which participants underwent a structured core stability training program using dumbbells throughout 18 sessions. The final stage involved a posttest administered to evaluate any improvements in crescent kick speed resulting from the training intervention. To analyze the data collected from the pre-and posttests, several statistical tests were applied, including a normality test, a homogeneity test, and a paired sample t-test to test the research hypothesis. These analyses aimed to determine whether the variation in core stability training had a statistically significant effect on improving crescent kick speed in male Pencak Silat athletes at SMPN 29 Medan.

Table 1. Frequency Distribution of Pretest Results (Crescent Kick Speed)

Value	Frequency
8-9	2
10-11	4
12-13	1
14-15	1
Sum	8

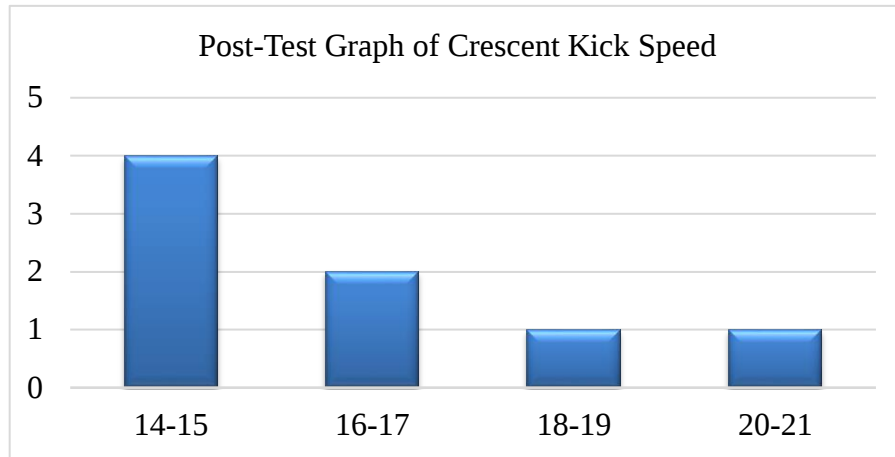


Figure 1. Histogram Graph of the Results of the Sickle Kick Speed Posttest

The frequency distribution data from the pretest, processed using the Sturges frequency distribution technique, yielded the following results: a class range of 7, some classes with a frequency of 4, and a class interval of 2. Of the eight athletes included in the class interval, two were in the 8 - 9 range, four were in the 10–11 range, one was in the 12 - 13 range, and one was in the 14 - 15 range. Following a 6-week structured training program with a training frequency of three times per week, posttest data were collected as the final assessment.

Table 2. Frequency Distribution of Posttest Results (Crescent Kick Speed)

Value	Frequency
8-9	2
10-11	4
12-13	1
14-15	1
Sum	8

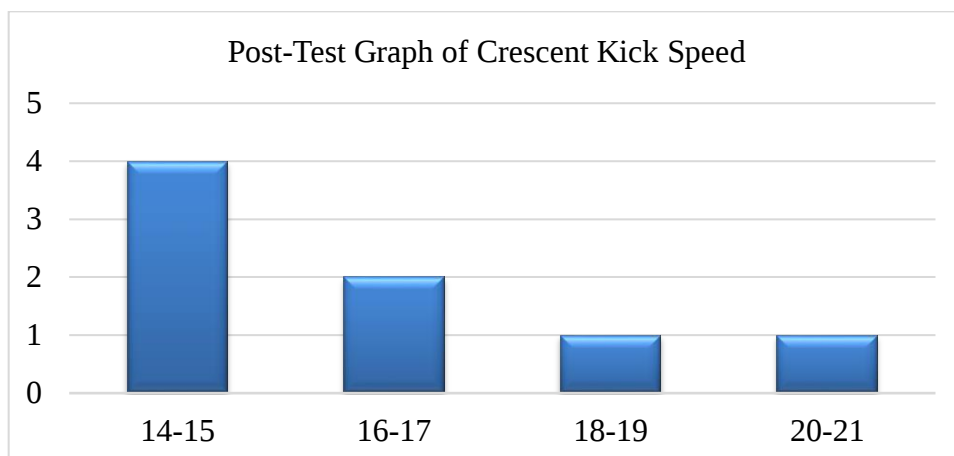


Figure 2. Histogram Graph of the Results of the Crescent Kick Speed Posttest

The frequency distribution data of the posttest results, processed using the Sturges frequency distribution technique, yielded the following results: a class range of 6, several classes of 4, and a class interval of 2. Out of a total of 8 athletes, four were in the 14-15 age group, 2 in the 16-17 age group, 1 in the 18-19 age group, and 1 in the 20-21 age group. After undergoing a 6-week structured training program with a training frequency of three times per week, posttest data were collected as the final assessment.

Table 3. Normality Test Results for Crescent Kick Speed

Variable	Mean and Standard Deviation	$L_{compute}$	L_{table}	α	Information
Pretest Crescent Kick	X = 87 S = 2.23	0,227	0,285	0,05	Usual
Posttest Crescent Kick	X = 129 S = 2.10	0,203	0,285	0,05	Usual

From the results of the Pretest calculation in Appendix 0.227, the level of $\alpha = 0.05$ and Table 0.285 were obtained. So $L_{count} = 0.227 < L_{table} = 0.285$. It can be concluded that the data distribution is normally distributed. From the results of the posttest calculation in the appendix, the L_o value of 0.203 has been obtained. At the $\alpha = 0.05$ level, $L_{table} = 0.285$ is obtained. So $L_{cal} = 0.203 < L_{table} = 0.285$. It can be concluded that the data distribution is normally distributed.

Table 4. Homogeneity Test of Crescent Kick Speed

Comparison	F_{hitung}	F_{tabel}	α	DF(N-1)	Information
Pretest vs. Posttest Variance	1,12	3,79	0,05	8	Homogeneous

The homogeneity test in each treatment was complemented by a change test at the level of importance $\alpha = 0.05$ between the pretest and posttest the speed of the crescent kick for the results of the homogeneity test between the pretest and posttest data of the Crescent Kick speed of the F_{table} value for $\alpha = 0.05$ obtained $F_{table} = 3.79$. Moreover, $F_{hitung} = 1.12$ This means that $F_{calculate} < F_{table}$ ($1.12 < 3.79$). So, it can be concluded that the pretest and posttest data of the speed of the crescent kick is homogeneous.

Table 5. Hypothesis Test (t-test) Results

Variable	<i>Pretest Crescent Kick</i>	<i>Posttest Kicks</i>	Different	DK(N-1)	Stuttgart	Table
		8				
Sum	87	129	42	7	10,93	1,89
Average	10,87	16,12	5,25			
SB	2,23	2,10	1,38			

Based on the results of the calculation carried out, the hypothesis calculated = 10.93, then the value is compared to $dk = (8-1 = 7)$ at a significant level of $\alpha = 0.05$, which is 1.89, thus calculating $> \text{table}$ ($10.93 > 1.89$). Therefore, it is concluded that the variation in core stability exercises has a significant influence on the speed of the pencak silat scythe kick at the Lapan Penjuru school SMPN 29 Medan in 2024.

The discussion of the research data analysis results aims to facilitate the drawing of conclusions from the research findings. Based on the hypothesis calculation using the t-test, with H_a accepted and H_o rejected, it can be concluded that there is a significant effect of core stability training variation on the speed of the crescent kick in Pencak Silat athletes at Perguruan Lapan SMPN 29 Medan in 2024. This conclusion was supported by the implementation of a structured training program that followed the principles of exercise science, including progressive overload, over a total of 18 sessions. The core stability exercises used in the program included jump-to-box drills, half-squat jumps, and high-knee exercises.

This study specifically emphasized the importance of core training in Pencak Silat, as a well-developed core contributes to improved agility, postural control, sensorimotor function, and movement efficiency. Core stability training strengthens the postural muscles, thereby enhancing trunk stability and posture—critical components in maintaining dynamic balance. Improvements in ankle strength and neuromuscular conduction also play a role in better movement coordination. A strong core provides a solid foundation that enables the upper and lower extremities to generate greater force during athletic performance.

In Pencak Silat, kicking techniques represent one of the primary offensive movements, used strategically to score points and defeat opponents. Among the most effective techniques is the crescent kick, known for its range and scoring

potential in competition. Executing an effective crescent kick demands several physical attributes, including leg muscular power, core strength, and hip joint flexibility. These elements work synergistically to generate a fast and accurate kicking motion. These components are involved in specific interconnected movements. Based on the analysis of data and hypothesis testing, there is a significant influence of core stability variations on the speed of the pencak silat roundhouse kick at Perguruan Lapan SMPN 29 Medan in 2024, with a t-calculated value of 10.93 being greater than the t-table value of 1.89. Thus, variations in core stability training conducted by training principles will significantly influence the improvement and enhancement of core stability, as well as the speed of the sabit kick in pencak silat at Perguruan Lapan SMPN 29 Medan in 2024. Future researchers are encouraged to explore additional factors that may affect crescent kick speed in pencak silat athletes. This could include examining the impact of different training tools, durations, or combinations of core stability and plyometric exercises. Investigating female athlete populations, more extended training periods, or larger sample sizes could also yield more generalizable findings. The integration of motion analysis technology or biomechanics tools is also recommended to assess kick mechanics in more detail.

CONCLUSION

Based on the hypothesis testing conducted, it can be concluded that variations in core stability training have a significant effect on the speed of the crescent kick in Pencak Silat athletes from the Lapan Penjuru Club at SMPN 29 Medan in 2024. The practical implications of these findings are valuable for both coaches and athletes. Coaches are encouraged to incorporate core stability training as a fundamental component of their regular training programs to enhance the effectiveness, speed, and execution of crescent kicks. Athletes, in turn, can benefit from improved muscle control, balance, coordination, and reduced risk of injury, which can lead to enhanced competitive performance and precision.

Based on the findings obtained from the use of varied training methods, the researcher offers the following recommendations for improving crescent kick performance in Pencak Silat athletes. For coaches, it is essential to ensure the availability of adequate training facilities and infrastructure. A supportive and

comfortable training environment can motivate athletes and enhance their enthusiasm and performance during training sessions. For future researchers: It is recommended to explore other contributing factors that may influence the improvement of crescent kick speed, particularly in Pencak Silat athletes. Expanding the scope of research may provide deeper insights and more comprehensive training strategies.

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