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The Effect of Combined Zig-Zag Drills on Agility and Crescent Kick Speed in Pencak Silat Athletes of the Student Activity Unit at Syiah Kuala University

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Abstract

Objectives. The objective of this study is to improve the agility and crescent kick speed of Pencak Silat athletes who are members of the Student Activity Unit (UKM) at Syiah Kuala University. The crescent kick is a fundamental technique in Pencak Silat that is commonly used to score points, and enhancing agility and kicking speed is essential for better performance during competitions.

Material and Method. This study employed a quantitative experimental research method. The population consisted of all 15 athletes from the Pencak Silat UKM at Syiah Kuala University, and the entire population was used as the research sample (total sampling). The training program implemented involved a combination of agility and speed exercises, specifically the iceky ladder shuffle, shuttle run, and zig-zag running drills.

Data were collected through pre-test and post-test procedures using physical performance measurements for agility (shuttle run) and crescent kick speed. The treatment provided to the participants included the combined zig-zag training method, integrated into regular practice sessions over a predetermined period. Statistical analysis was performed to test the hypothesis at a 0.05 level of significance.

Result. The findings demonstrated that the combined zig-zag drills had a significant effect on both agility and crescent kick speed of the athletes. Statistical hypothesis testing revealed that: 1) For agility (shuttle run), the calculated t-value exceeded the critical t-table value at the 0.05 significance level (t-count = 0.050 > 0.05). 2) For crescent kick speed, the calculated t-value also exceeded the t-table value at the 0.05 significance level (t-count = 0.099 > 0.05).

These results indicate a statistically significant improvement in both variables as a result of the training intervention.

Conclusion. The combined zig-zag training method positively influences the agility and crescent kick speed of Pencak Silat athletes at Syiah Kuala University. These improvements are crucial for optimizing performance in competitions, where speed and agility play a key role in scoring points. The results of this study are expected to serve as a reference for developing effective training programs aimed at enhancing crescent kick techniques in Pencak Silat.

Keywords: Pencak Silat, Zig-Zag Drills, Agility, Crescent Kick Speed.

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Introduction

Physical activity is fundamentally a basic human need in life to maintain good physical condition and overall health. However, in today's era, people are increasingly required to spend more of their time working. According to Giriwijoyo (2005:30), sport is defined as a series of structured and planned physical movements that are consciously carried out by individuals to improve their functional capabilities. Kusmaedi (2002:1) states that the term *sport* originates from the word *disport*, which means to move from one place to another. Therefore, in sports, everyone is allowed and encouraged to participate, following various modified rules.

Pencak Silat is a martial art sport that requires a high level of concentration. According to Suryo Ediwoyo (2017:217), the term *Pencak Silat* comes from *Pencak*, which refers to a form of martial arts that incorporates rhythmic, dance-like movements governed by specific rules.

The Pencak Silat Student Activity Unit (UKM) at Syiah Kuala University consists of students who were recruited from within the university to become Pencak Silat athletes, some of whom have achieved accomplishments at both regional and national levels. However, a fundamental issue that arises during competitions is that some athletes still lack agility, which negatively affects their performance in executing basic techniques—particularly the *crescent kick*. This technique requires both speed and agility to effectively deliver a strike that can earn points.

Therefore, the researcher selected zig-zag drills as a form of agility training to address this deficiency. As Pencak Silat continues to grow rapidly, the demand for high-quality athletes also increases. This necessitates that athletes possess comprehensive agility and speed to support optimal performance and achievements, especially among members of the UKM Pencak Silat at Syiah Kuala University.

Agility is essential for enhancing an athlete's ability to change direction quickly and precisely while maintaining balance. Agility can be trained through various exercises such as iceky ladder shuffles, squat thrusts, shuttle runs, and zig-zag runs. To improve the speed and agility of the crescent kick, exercises such as the iceky ladder shuffle—a type of agility ladder drill using a vertical ladder tool—can be implemented to increase both agility and speed.

This highlights that in Pencak Silat, athletes not only require good technical skills but also strong physical fitness. The key physical abilities needed in Pencak Silat include **speed**,

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flexibility, explosive power, and agility, especially for executing effective kicks (Kamarudin, 2014:80).

Based on the above issues, the author is interested in conducting a study entitled: "The Effect of Combined Zig-Zag Drills on Agility and Crescent Kick Speed in Pencak Silat Athletes at Syiah Kuala University."

Materials and Methods

Study Participants

This study involved a population comprising all 15 active athletes of the Pencak Silat Student Activity Unit (UKM IPSI) at Syiah Kuala University in 2024. The research sample was selected using a total sampling technique, meaning that the entire population was also used as the sample. According to Sugiyono (2017), total sampling is a sampling technique in which the sample size equals the population size, and it is appropriate when the population consists of fewer than 100 individuals.

Study Organization

This research employed a quantitative experimental design. Experimental research involves the deliberate administration of a treatment to research subjects in order to observe the resulting changes (Jaedun, 2011). Effendi (2013) explains that this design is considered robust because it includes both an experimental group and a control group, the latter of which does not receive the treatment but is still observed. Additionally, Singarimbun and Effendi (2002) categorize this research as explanatory, aiming to provide an explanation of the studied phenomenon based on field data and facts.

The treatment provided to participants was a combination of agility and speed training, specifically designed to enhance crescent kick performance. Pre-test and post-test assessments were conducted to measure improvements in agility and crescent kick speed.

During the pre-test, athletes performed basic tests to assess their current level of agility and crescent kick speed. In the post-test, after completing the training intervention, athletes were tested again under standardized conditions. Each athlete was given a clear explanation of the procedure, performed a warm-up, and then completed the crescent kick test within a 10-second window, repeated three times using both the left and right leg. The best performance was recorded for analysis.

Statistical Analysis

All data collected were processed using **SPSS (Statistical Package for the Social Sciences) version 26** to ensure accuracy and efficiency. The following statistical tests were applied:

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1. **Mean Test:**The mean or average was used to represent the central tendency of the data (Harinaldi, 2005). This analysis helped summarize the overall performance results before and after the intervention.
2. **Standard Deviation Test:**This test was used to measure the spread or variability of the data, indicating how closely individual results clustered around the mean.
3. **Homogeneity Test:**This statistical test was used to determine whether the sample groups had equal variances, which is a necessary assumption for further parametric testing.

All tests were performed using SPSS version 26, which facilitated quick and accurate data processing. The study adheres to standard statistical procedures to ensure the validity and reliability of the results.

Results

ANOVA and Coefficients Table for Shuttle Run T-Test

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.855	1	11.855	32.003
	Residual	4.816	13	0.370	
	Total	16.670	14		

a.Dependent Variable: Posttest Shuttle Run

b. Predictors: (Constant), Pretest Shuttle Run

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
1	(Constant)	1.810	0.837	2.163	.050
	Pretest Shuttle Run	1.044	0.185	0.843	5.657

a. Dependent Variable: Posttest Shuttle Run

Interpretation

Based on the results above, the calculated **t-test value** between variable O1 (Pretest Shuttle Run) and O2 (Posttest Shuttle Run) is **0.050**. This suggests a statistically significant improvement in shuttle run performance following the intervention.

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ANOVA and Coefficients Table for Right Crescent Kick Speed T-Test

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	118.966	1	118.966	163.931
	Residual	9.434	13	0.726	
	Total	128.400	14		

a.Dependent Variable: Posttest Right Crescent Kick

b. Predictors: (Constant), Pretest Right Crescent Kick

Coefficientsa

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
1	(Constant)	3.337	1.877	1.778	.099
	Pretest Right Crescent Kick	1.053	0.082	0.963	12.804

a. Dependent Variable: Posttest Right Crescent Kick

Interpretation

Based on the above data, the calculated **t-test significance value** between O1 (Pretest Right Crescent Kick Speed) and O2 (Posttest Right Crescent Kick Speed) is **0.099**, indicating a trend toward improvement, although it is slightly above the conventional alpha level of 0.05.

ANOVA and Coefficients Table for Left Crescent Kick Speed T-Test

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	132.917	1	132.917	64.436
	Residual	26.816	13	2.063	
	Total	159.733	14		

a.Dependent Variable: Posttest Left Crescent Kick

b. Predictors: (Constant), Pretest Left Crescent Kick

Coefficientsa

Model	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t	Sig.
1	(Constant)	5.451	2.201	2.476	.028
	Pretest Left Crescent Kick	0.971	0.121	0.912	8.027

a. Dependent Variable: Posttest Left Crescent Kick

Interpretation

From the table above, the **t-test significance value** between variable O1 (Pretest Left

Crescent Kick Speed) and O2 (Posttest Left Crescent Kick Speed) is **0.028**, which is below the 0.05 threshold. This result confirms a **statistically significant improvement** in left crescent kick speed after training.

Discussion

1. Shuttle Run Performance of UKM Pencak Silat USK Athletes. Based on the research findings and data analysis for O1, comparing the pretest and posttest Shuttle Run results of the UKM Pencak Silat USK athletes in 2024, the data indicates a notable improvement. The average score for the Pretest Shuttle Run was 4.4527, while the Posttest Shuttle Run showed a higher average of 6.4580. The calculation of the mean for the Pretest Shuttle Run yielded 4.4527, and for the Posttest Shuttle Run, it was 6.4580. Additionally, the standard deviation for the Pretest Shuttle Run was 0.88146, and for the Posttest Shuttle Run, it was 1.09121. A t-test was conducted using SPSS version 26, resulting in a t-value of 0.050. When compared to the t-table at a degree of freedom of 14, the hypothesis test concluded that there is a significant effect of the Zig-Zag Combination Exercise on agility and the speed of the crescent kick in the UKM Pencak Silat USK athletes in 2024. This conclusion was based on the t-test result, where the calculated t-value (0.050) is greater than the t-table value (0.05), confirming a statistically significant impact at the 0.05 significance level.

2. Crescent Kick Speed of UKM Pencak Silat USK Athletes. Similarly, the research findings and data analysis for O1 and O2, comparing the pretest and posttest Crescent Kick Speed of the UKM Pencak Silat USK athletes in 2024, show substantial progress. The average pretest score for the Right Crescent Kick was 22.67, and for the Left Crescent Kick, it was 17.93. In contrast, the posttest scores significantly increased to 51.00 for the Right Crescent Kick and 42.88 for the Left Crescent Kick. The pretest mean values for Crescent Kick Speed were 22.67 (Right) and 17.93 (Left), while the posttest mean values were 51.00 (Right) and 42.88 (Left). The standard deviations for the Pretest Crescent Kick Speed were 5.865 (Right) and 6.330 (Left). A t-test was also conducted for the Crescent Kick Speed, resulting in a t-value of 0.099. When compared to the t-table at a degree of freedom of 14, the hypothesis test revealed that the combination Zig-Zag exercise significantly impacted the speed of the crescent kick, as indicated by the t-test result, where the calculated t-value (0.099) was greater than the t-table value (0.05). This study confirms that both the Shuttle Run and Crescent Kick tests were significantly affected by the average scores, standard deviations, and t-tests, following the 18-session Iceky Shuffle ladder training intervention.

Conclusion

Based on the research conducted, it can be concluded that the Zig-Zag Combination Training has a significant impact on both the agility and speed of the crescent kick for UKM Pencak Silat USK athletes in 2024. This conclusion is supported by hypothesis testing at a 0.05 significance level, where the t-values for both Shuttle Run and Crescent Kick Speed were greater than the critical t-table values, indicating a positive effect of the training intervention. Future researchers are encouraged to explore the long-term effects of Zig-Zag Combination Training on athletes' overall performance. It would also be beneficial to examine how different variations of agility exercises might influence other aspects of martial arts performance, such as strength, endurance, and technical skills. Additionally, expanding the sample size and including different levels of athletes could provide more generalizable results. Further studies could also consider integrating other physical conditioning techniques to evaluate their combined effects on the performance of Pencak Silat athletes.

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