Journal of Indonesian Physical Education and Sport
P-ISSN 2442-4900 | E-ISSN 2461-1271
Vol. 5, No.1, July 2019 page 49-62

Effect of Plyometrics Training and Achievement Motivation on the Ability of Crescent Kicks in the Pencak Silat Sport

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Abstract

This research type was an experimental research with treatment by level design. The research is aimed at investigating the influence of plyometrics exercises and achievement motivation on the ability of crescent kick in martial arts sport. Each group performed a crescent kick test before and after treatments with the test instruments kick of martial arts sport and achievement motivation questionnaire. There were significant differences between the methods of stride jump crossover exercises:11.42, while box jump exercises: 9.59. The F-test significant showed F_{count}= 88.23 higher than F_{table}= 1,62, with the level of significance 0,05,There was a positive interaction between plyometricsexercise methods and achievement motivation on the ability of the crescent kick, it was indicated by the value of F_{count} (Fh)= 103.04, higher than F_{table} (Ft)= 1.62. The kick abilty of athletes who have high motiviation trained through stride jump crossover was better, the average value stride jump crossover=12.28,while the box jump exercises = 8.90, with the level of significance,α = 0.05 over, t_{count}=11.74, higher than t_{table} =1.68. While the kick ability of athletes who have low motivation trained through box jump was better, the average value of the atheletes' kick ability trained through stride jump crossover = 10.13, while the box jump exercises = 10.28, with the level of significance, α = 0.05 over, t_{count} =0.55 lower than t_{table}= 1.68.

Keywords: *plyometric method, achievement motivation, the ability of Crescent kick.*

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P-ISSN 2442-4900 | E-ISSN 2461-1271
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INTRODUCTION

Pencak silat is a form of martial art typical of the Indonesian nation. Its development is very rapid with more and more people from various other countries learning about pencak silat. Likewise its development in the country. Pencak silat competitions are often held to raise awareness of the coaching process. The definition of pencak silat according to (Notosoejitno, 1997), is, "High-level martial arts movements are equipped with feelings, so that they are effective and controlled mastery of movement and are often used in training or competition.

Movement skills in the sport of pencak silat include kicks, punches, parries, avoidances and falls. Each of these motion techniques has its own functions and uses. Kick techniques have 4 types of kicks, namely: crescent, rear, side and straight kicks. Punching techniques include: straight punches, pendulum, acupressure, twins and side punches. The technique of parry includes: outer, inner, side, and lower block. Avoidance techniques include: side, front and rear avoidance. The fall technique includes: a force drop where we lift the opponent's body, a sweep drop where this fall uses one leg by slashing the lower part of the opponent's leg, and a lay fall where we drop our body and then extend one leg to the opponent's lower leg.

Kick is a technique of motion in the sport of pencak silat which has high value and is one of the techniques that is often used in every match. One of them is the sickle kick, according to (Notosoejitno, 1997) the sickle kick is a kick that is carried out using one leg and leg, the trajectory is from the side and the impact is on the instep. The use of kick techniques in matches tends to be more effective in collecting numbers and achieving attack targets, but in observations at various pencak silat martial arts competitions in Pontianak it is often found that athletes in carrying out attacks lack the ability to kick a sickle well as a result of the attacks that use The elements of speed (speed), explosive power (power), endurance (enduren) that are done repeatedly become less patterned and have no effect on the opponent, so the attack seems careless.

It appears that when athletes participate in a competition they can only do the tide rule well, but are slow in carrying out an attack and in the following rounds the attack does not hit the target and the kick speed is slow and does not have the strength and explosive power so that in the next round the athlete These are the months when the opponent is being roared, both attacked and slammed. In addition, there are other factors that influence the athlete's performance, namely the motivational factor in high achievement, both during training and during competition. According to (Tangkudung, 2012) "motivation is an impulse that arises from a person consciously or unconsciously to take an action with a specific purpose. Such a lack of motivation cannot contribute to the improvement of the performance of pencak silat.

Based on that, it is necessary to make breakthroughs in using a fairly developed training method in sports, namely the plyometric training method,(Bompa Tudor O and

DOI: https://doi.org/10.21009/JIPES.051.06

JIPES
Journal of Indonesian Physical Education and Sport
P-ISSN 2442-4900 | E-ISSN 2461-1271
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Michael Carrera, 2009), states that "plyometric training can also cause muscle and nerve changes that facilitate and improve faster motion performance ". The training program that can be done to improve kicking ability is to do various forms and forms of plyometric exercises such as the example of the stride jump crossover and box jamp exercises. This exercise is one of the variations of plyometric exercises that can be done to increase the explosive power of the kick ability. As explained by (Johansyah Lubis, 2013), "To develop power training can be done in various ways such as with plyometric exercises".

This study aims to obtain descriptions and answers, which include the following: 1) Differences in Stride Jump Crossover and Box Jump Exercises and the motivation to act will have a better effect on the ability of sickle kicks. 2) The effect of the interaction between the Plyometric Stride Jump Crossover training method and Box Jump training and the motivation to pretend to the sickle kick ability; 3) Differences The group with high achievement motivation who did the Stride Jump Crosover exercise was better than the effect compared to those who did the Box Jump on the ability of the sickle kick; 4) Differences The group with low achievement motivation who did Box Jump exercises was better than those who did Stride Jump Crosover training on sickle kick ability.

METHOD

This type of research is experimental, with the dependent variable the ability to kick sickle, the independent variable (treatment variable) the plyometric training method and the control variable achievement motivation. The population of this research is 59 athletes of Tangerang youth fighter in the city of Tangerang. Whereas for a sample of 32 people, for the determination of the sample by means of propulsive rondom sampling which paid attention to the results of the questionnaire grouping respondents with high achievement motivation levels and low achievement motivation which refers to the stated principles based on Verducci's opinion. The experimental research design used was the 2x2 treatment by level design. The independent variables are classified into plyometric stride jump crossover and box jump plyometric training methods, while the control variables are classified into high achievement motivation and low achievement motivation. In this study, it can be described in the form of a contraction as follows

Plyometric exercises / Achievement Motivation	Stride Jump Crossover (A_1)	Box jump (A_2)
Hih Motivation (B_1)	A_1B_1	A_2B_1
Low Motivation (B_2)	A_1B_2	A_2B_2

Tabel.1 Image: Design Treatment by level 2 x 2

DOI: https://doi.org/10.21009/JIPES.051.06

Journal of Indonesian Physical Education and Sport
P-ISSN 2442-4900 | E-ISSN 2461-1271
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Information :
A1: Form of the Stride Jump Crossover exercise
A2: Form a Box Jump exercise
B1: High Achievement Motivation
B2: Low achievement motivation
A1B1: Average result of a side kick that has high achievement motivation by doing the Stride Jump Crossover exercise.
A2B1: Average result of the side kick ability which has high achievement motivation by doing Box Jump training.
A1B2: Average result of a side kick ability with low motivation to perform by doing Box jump training.
A2B2: Average result of side kick ability with low achievement motivation by doing the Stride Jump Crossove exercise.

The instruments used in this study consisted of a sickle-kick test and achievement motivation questionnaire. Achievement motivation measurement was carried out at the beginning of the study, the results were used to group athletes into high achievement motivation groups and low achievement motivation groups. Meanwhile, the measurement of the ability of the sickle kick was carried out after the experimental process was completed. In general, descriptive statistical techniques are used to obtain data definitions. Meanwhile, to test the hypothesis, a two-way analysis of variance (Anava) technique was used. Before testing the hypothesis, the analysis requirements test is conducted, in the form of a normality test and a homogeneity test. If the results of the analysis of variance show the main effect (main effect), the independent variable on the bound pariabel and the interaction effect (intraraction effect) between the independent variable and the control variable on the dependent variable, then the analysis continues with further analysis using the Tukey test to determine difference between anther cells.

RESULTS AND DISCUSSION

Table 2, Summary of general sickle kick abilities

Achievement Motivation(B)	Plyometric training method (A)	
	Stride jump crossover (A1)	Box jump (A2)
High (B1)	$\sum x = 101.61$	$\sum x = 71.19$
	$\sum x^2 = 1292.48$	$\sum x^2 = 634.33$
	$\bar{x} = 12.70$	$\bar{x} = 8.90$
	S = 0.52	S = 0.34
	n = 8	n = 8
Low (B2)	$\sum x = 81.07$	$\sum x = 82.25$
	$\sum x^2 = 825.91$	$\sum x^2 = 847$
	$\bar{x} = 10.13$	$\bar{x} = 10.28$
	S = 0.79	S = 0.44

DOI: https://doi.org/10.21009/JIPES.051.06

Journal of Indonesian Physical Education and Sport
P-ISSN 2442-4900 | E-ISSN 2461-1271
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	n = 8	n = 8
Total	$\sum x$ = 182.69	$\sum x$ = 153.44
	$\sum x^2$ = 2118.40	$\sum x^2$ = 1481.33
	$\bar{x}$ = 11.42	$\bar{x}$ = 9.59
	S = 1.48	S = 0.81
	n = 16	n = 8

The description of the research data is an overview of the characteristics of the sickle kick ability of the athletes who are the subjects in this study. The ability of sickle kicks which were divided into four groups, based on plyometric training methods (stride jump crossover and box jump), and achievement motivation (high and low), which were tested in this study, were each described as follows:

A. Description of the increase in sickle kick ability in the stride jump crossover (A1) plyometry training method group

From the sickle kick ability data generated in the plyometric stride jump crossover training method group as a whole, the maximum score was 13.19 and a minimum score of 9.40 while the average score of sickle kick ability was 11.42, with a standard deviation of 1.48 with the frequency distribution as shown in the histograph below. the following.

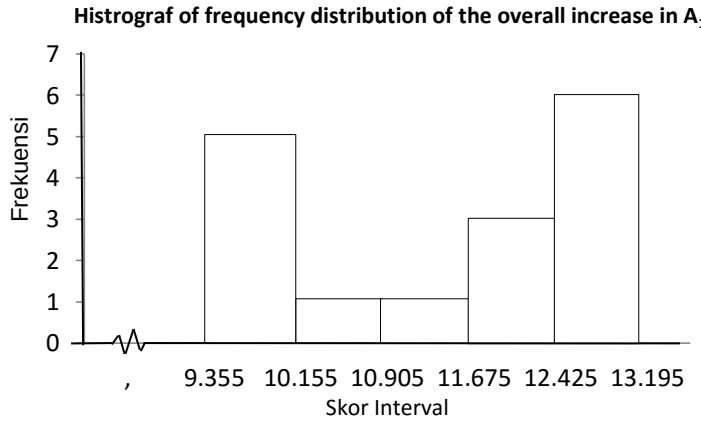

Figure 1. The histogram of the frequency distribution of the score for the improvement of sickle kick ability of the group as a whole plyometric stride jump crossover training method

Based on the histograph data above, it is known that 31% (5 people) obtained a score of improvement in sickle kick ability below the average, 6% (1 person) on the average and 57% (9 people) above the average. This distribution illustrates the ability of athletes in the plyometric stride jump crossover training method group to be relatively balanced.

B. Description of increasing the ability to kick sickle in the box jump plyometry training method group (A2)

From the sickle kick ability data produced in the box jump plyometric training method group as a whole, obtained a maximum score of 10.69 and a minimum score of 8.40.

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Journal of Indonesian Physical Education and Sport
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As for the mean score of sickle-kicking ability of 9.59 with a standard deviation of 0.81. with the frequency distribution as shown in the histrograph image below.

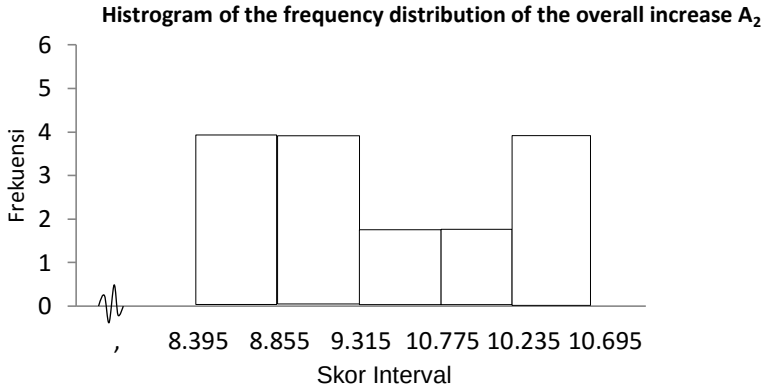
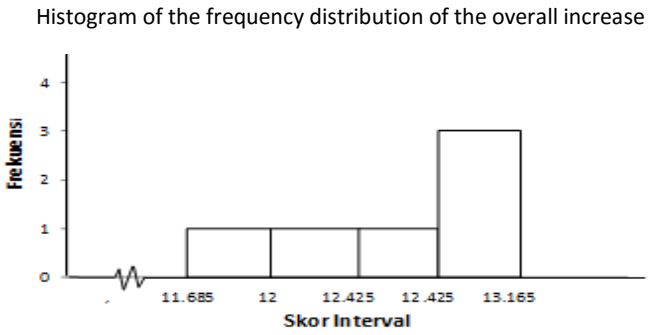


Figure 2.The histogram of the frequency distribution of scores for the increase in the ability of the sickle kick in the group as a whole plyometric training method box jump

Based on the histograph data above, it is known that 50% (8 people) obtained a score of improvement in sickle kick ability below the average, 12.50% (2 people) on average and 37.50% (6 people) above the average. This distribution illustrates the ability of athletes in the box jump plyometric training method group to be relatively balanced.

C. Description of increasing the ability to kick sickle in the high achievement motivation group with the stride jump crossover plyometry training method (A1B1)

From the sickle kick ability data produced in the high achievement motivation group with the overall stride jump crossover plyometric training method, the maximum score is 13.16 and the minimum score is 11.69. As for the average score of sickle-kicking ability is 12.70 with a standard deviation of 0.52. with the frequency distribution as shown in the histrograph image below.



Picture. 3. Histrogram of the frequency distribution of scores for increasing the ability of the sickle kick in the high achievement motivation group with the overall stride jump crossover plyometric training method

Based on the histrograph data above, it is known that 25% (2 people) obtained a score of improvement in sickle kick ability below the average, 12.50% (1 person) on average and

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Journal of Indonesian Physical Education and Sport
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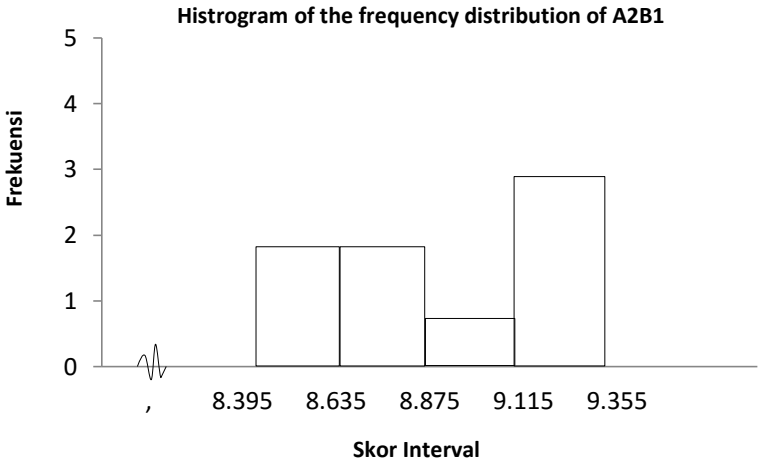
62.50% (5 people) above the average. This distribution illustrates the ability of athletes in the high achievement motivation group with the relatively balanced stride jump crossover plyometric training method.

D. Description of increasing the ability to kick sickle in the high achievement motivation group with the stride jump crossover plyometric training method (A2B1)

From the crescent kick ability data produced in the high achievement motivation group with the box jump plyometric training method as a whole, the maximum score was 9.35 and the minimum score was 8.40. As for the average score of sickle-kicking ability is 8.95 with a standard deviation of 0.34. with the frequency distribution as shown in the histrograph image below



Picture. 4. Histrogram of the frequency distribution of scores for the increase in the ability of the sickle kick in the group as a whole plyometric training method box jump

Based on the histrograph data above, it is known that 50% (4 people) obtained a sickle kick ability improvement score below the average, 12.50% (1 person) on average and 37.50% (3 people) above the average. This distribution illustrates the ability of athletes in the high achievement motivation group with the box jump plyometric training method to be relatively balanced.

E. Description of increasing the ability to kick sickle in the low achievement motivation group with the stride jump crossover plyometry training method (A1B2)

From the sickle kick ability data produced in the low achievement motivation group with the overall stride jump crossover plyometric training method, the maximum score is 11.68 and the minimum score is 9.40 while the average score of sickle kick ability is 10.13 with a standard deviation of 0.79 with the frequency distribution as shown. in the histograph image below.

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Journal of Indonesian Physical Education and Sport
P-ISSN 2442-4900 | E-ISSN 2461-1271
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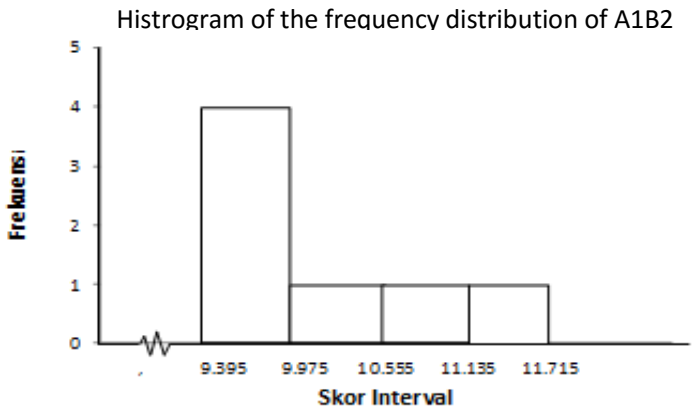

Figure .5. The histrogram of the frequency distribution of the score for the improvement of sickle kick ability in the low achievement motivation group with the overall stride jump crossover plyometric training method

Based on the histrograph data above, it is known that 75% (5 people) obtained a score of improvement in sickle kick ability below the average, 12.50% (1 person) on average and 12.50% (1 person) above the average. This distribution illustrates the ability of athletes in the low achievement motivation group, the stride jump crossover plyometric training method is relatively balanced.

F. Description of increasing the ability to kick sickle in the low achievement motivation group with the box jump plyometry training method (A2B2)

From the crescent kick ability data generated in the low achievement motivation group with the box jump plyometric training method as a whole, the maximum score was 10.69 and a minimum score of 9.60. As for the mean score of sickle-kicking ability is 10.28 with a standard deviation of 0.44. with the frequency distribution as shown in the histrograph image below.

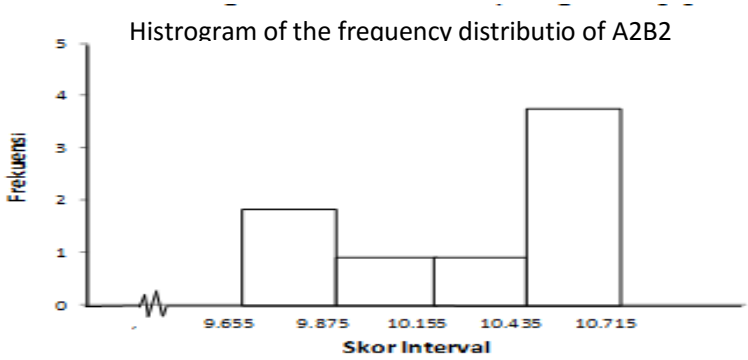

Figure .6. The histogram of the frequency distribution score of the improvement of the sickle kick ability of the low achievement motivation group with the overall box jump plyometric training method

DOI: https://doi.org/10.21009/JIPES.051.06

JIPES
Journal of Indonesian Physical Education and Sport
P-ISSN 2442-4900 | E-ISSN 2461-1271
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Based on the histrograph data above, it is known that 37.50% (3 people) obtained a score of improvement in sickle kick ability below the average, 12.50% (1 person) on average and 50% (4 people) above the average. This distribution illustrates the ability of athletes in the low achievement motivation group with the box jump plyometric training method to be relatively balanced.

A. Testing Requirements Analysis

1. Data Normality Test

Hypothesis testing in this study was carried out using two-way analysis of variance (ANOVA). For this reason, the data that has been collected before the analysis is first carried out with the requirements test, which includes the normality test using the lilliosphere and the homogeneity test using the Barlett test.

The results of the normality test above can be summarized in the following table.

Table 2. Recapitulation of data normality test results with the lilliosfors test at a significant level $\alpha = 0.05$

Group	N	L_o	L_t	inference
A_1	16	0.177	0.213	Normal
A_2	16	0.137	0.213	Normal
A_1B_1	8	0.212	0.285	Normal
A_1B_2	8	0.127	0.285	Normal
A_2B_1	8	0.243	0.285	Normal
A_2B_2	8	0.242	0.285	Normal

2. Homogeneity test

Testing the homogeneity of variance in this study, researchers used the Barlett test with a significance level of $\alpha = 0.05$. For the homogeneity test of variance used only four groups, namely A1B1, A2B1, A1B2, A2B2 and summarized in the following table 4.9.

Table 3. Summary of the results of the variance homogeneity of the four groups with significant level

Sample	Dk	1/dk	Si	Si^2	Log Si^2	(dk) Log Si^2
A_1B_1	7	0.14	0.52	0.27	-0.57	-3.98
A_1B_2	7	0.14	0.79	0.62	-0.20	-1.43
A_2B_1	7	0.14	0.34	0.12	-0.94	-6.56
A_2B_2	7	0.14	0.44	0.19	-0.71	-4.99
Total	28					-16.96

The test results show that X2count = 5.42 <X2table (0.953) = 7.81, thus Ho is accepted. This means that the four data groups mentioned above have the same variance

DOI: https://doi.org/10.21009/JIPES.051.06

Journal of Indonesian Physical Education and Sport
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(homogeneous). Thus it can be concluded that the sickle kick score data of the four groups A1B1, A1B2, A2B1, and A2B2 are homogeneous.

3. Testing the research hypothesis

The research hypothesis testing was carried out using two-factor interaction analysis of variance (ANOVA 2 X 2). Furthermore, if there is an interaction, the analysis used is the t test. Two-way analysis of variance is used to test the main effect (maint effect) and interaction (interaction effect), the independent variables consist of (1) plyometric training methods (stride jump crossover and box jump) and (2) achievement motivation (high and low). While the dependent variable is the ability to kick sickle. Furthermore, the data analysis performed using Anava is summarized and presented in the following table 11.

Table 4. The summary of the results of the anova sickle kick ability data

Source variant	Dk	Db	RJK	F_{hitung}	F_{tabel} $\alpha = 0,05$
Between A	2.81	1	2.81	9.27^{**}	1.62
Between B	26.72	1	26.72	88.23^{**}	1.62
Interaction A x B	31.20	1	31.20	103.04^{*}	1.62
insede	8.48	28	0.30		
Total	69.21	31			

Description :
ns = non significant
□ = Significant at α = 0.05
Db = degrees of freedom
Dk = Degree of freedom
RJK = Average Sum of Squares
Fh = Price F count
Ft = F table price

Based on the results of the analysis of variance (ANOVA) calculations above, some of the things are as follows:

1. Differences in the results of the sickle kick of athletes trained using the plyometric stride jump crossover (A1) training method with athletes trained using the box jump plyometric training method (A2)

The results of data analysis using two-way ANOVA at the significant level α = 0.05 mentioned above, give Fcount (Fh) = 88.23 greater than Ftable (Ft) = 1.62. this means that Ho is rejected as a consequence HI is accepted. The average value of the results of the ability of athletes trained by the plyometric stride jump crossover training method is 11.42, which is greater than the average value of the results of the athletes' ability trained using the box jump plyometric training method 9.59. Thus it can be concluded that the results of the sickle kick

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JIPES
Journal of Indonesian Physical Education and Sport
P-ISSN 2442-4900 | E-ISSN 2461-1271
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ability of athletes who are trained using the plyometric stride jump crossover training method are higher than the results of the sickle kick ability of athletes trained using the box jump plyometric training method, in other words the results of the A1 sickle kick ability are higher than A2.

2. Interaction between plyometrics training methods and achievement motivation on the ability of the crescent kick

The results of data analysis using two-way ANOVA at a significant level α = 0.05 indicate that the value of Fcount (Fh) = 103.04 is greater than Ftable (Ft) = 1.62, this means that Ho is rejected as a consequence HI is accepted. Thus it can be concluded that there is a significant interaction between the plyometric training method and achievement motivation on the ability to kick sickle. With the significant interaction effect between the plyometric training method and achievement motivation on the ability of the sickle kick, a multiple comparation test was carried out. This test is intended to determine which groups differ significantly, to use the t-test.

The t-test was carried out on the mean scores of groups A1B1 with A2B1, and A1B2 with A2B2 for effect sample A (plyometric training method), while for effect sample B (achievement motivation) groups A1B1, A1B2, and A2B1 with A2B2. The test results at the significant level α = 0.05 are summarized in the following table.

Table 5. Summary of the results of the calculation of the follow-up test differences in the mean ability of sickle kicks with the t-test

Group Pairs	t_{hitung}	Q_{tabel} (α=0.05)	explanation
A_1B_1 With A_2B_1	11.74	1.78	Significant
A_1B_2 with A_2B_2	0.55^{ns}	1.78	not Significant
A_1B_1 with A_1B_2	7.96	1.78	Significant
A_2B_1 with A_2B_2	5.11	1.78	Significant

Based on the results of the t test above, it can be explained:

1. Differences in the ability of athletes trained using the stride jump crossover (A1) plyometric training method using the box jump plyometric training method (B1) in the high achievement motivation group (B1)

With the t-test for groups A1B1 with A2B1, the value of tcount = 11.74 and ttable with α = 0.05, and db = 28 is 1.68, thus, tcount = 11.74 is greater than tcount with α = 1.68. The results of data analysis using the t-test between athletes trained with the plyometric stride jump crossover training method and the box jump training method in the high achievement motivation group at the significance level of α = 0.05 above, tcount = 11.74 is greater than ttable = 1.68. this means that Ho is rejected and HI is accepted. Thus it can be concluded that

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the results of the ability of athletes trained using the plyometric stride jump crossover (A1) training method are higher than the results of the abilities using the box jump training method (A2) on high achievement motivation (B1). In other words, the results of the kick ability between the A1B1 group were higher than the A2B1 group

2. Differences in the ability of athletes trained using the box jump plyometric training method (A2) and the stride jump crossover plyometric training method (A1) In the low achievement motivation group (B2)

With the t-test for group A2B2 with A1B2, the value of tcount = 0.55 and ttable with α = 0.05, and db = 28 is 1.78, thus, tcount = 0.55 is smaller than ttable with α = 1.78. the results of data analysis using the t-test between athletes who were trained with the box jump plyometric training method and with the stride jump crossover training method in the low achievement motivation group at the insignificance level α = 0.05 above, tcount 0.55 was smaller than ttable = 1.78. this means that Ho is accepted and HI is rejected. Thus it can be concluded that the results of the ability of athletes trained using the A2 box jump plyometric training method are higher ($\bar{x}$ = 10.28, s = 0.44) than the results of the ability using the A1 stride jump crossover training method ($\bar{x}$ = 10.13; s = 0.79) in low achievement motivation (B2). In other words, the results of the kick ability between the A2B2 group were higher than the A1B2 group.

3. Differences in the skills of highly motivated athletes (B1) with low motivation (B2) in the stride jump crossover plyometric training method (A1)

With the t-test for groups A1B1 with A1B2, the value of tcount = 7.96 and ttable with α = 0.05, and db = 28 is 1.68, thus, tcount = 7.96 is greater than ttable with α = 1.68. The results of data analysis using t-test between athletes with high achievement motivation and low achievement motivation athletes in the stride jump crossover plyometric training method group at the significance level α = 0.05 above, tcount = 7.96 is greater than t table = 1.68. this means that Ho is rejected and HI is accepted. Thus it can be concluded that the results of the ability of high motivation athletes (B1) are higher than the results of abilities with low achievement motivation (B2) in the stride jump crossover plyometric training method (A1). In other words, the results of the kick ability between the A1B1 group were higher than the A2B1 group.

4. Differences in the skills of low-motivated athletes (B2) with high motivation (B1) in the box jump plyometric training method (A1)

With the t-test for groups A1B1 with A1B2, the value of tcount = 5.11 and ttable with α = 0.05, and db = 28 is 1.68, thus, tcount = 5.11 is greater than ttable with α = 1.68. The results of data analysis using t-test between athletes with low achievement motivation and high achievement motivation athletes in the Box jump plyometric training method group at

DOI: https://doi.org/10.21009/JIPES.051.06

the significance level of α = 0.05 above, tcount = 5.11 is greater than t table = 1.68. this means that Ho is rejected and HI is accepted. Thus it can be concluded that the results of the ability of athletes with low motivation (B2) are higher than the results of abilities with high achievement motivation (B1) in the box jump plyometric training method (A2). In other words, the results of the kick ability between the A2B2 group were higher than the A2B1 group.

CONCLUSION

Based on the results of data processing and analysis, the conclusions of the results of this study are as follows: First: Overall, there is a significant difference between the plyometric stride jump crossover training method and the plyometric box jump training method on the sickle kick ability in the sport of pencak silat. This is indicated by the average score of the kick ability of athletes trained with plyometric stride jump crossover: 11.42, while box jump plyometric exercise: 9.59. The significant result shows that Fcount = 88.23 is greater than Ftable = 1.62, with a significant level of 0.05. Second: There is a positive interaction between training methods and achievement motivation on the ability to kick sickle. This is indicated by the value of the value Fcount (Fh) = 103.04 greater than Ftable (Ft) = 1.62 this means that Ho is rejected as a consequence Hi is accepted, Third: For athletes who have high achievement motivation, the plyometric stride jump crossover training method is better compared to the box jump plyometric training method on the ability of a sickle kick. This is indicated by the average value of the kick ability of athletes who are trained with plyometric stride jump crossover = 12.28 while box jump plyometric training = 8.90, the significance level of α = 0.05 above, tcount = 11.74 is greater than ttable = 1.68, Fourth: For athletes those who have low achievement motivation, the box jump plyometric training method is better than the plyometric stride jump crossover training method on the ability of the crescent kick. This is indicated by the average value of the kick ability of athletes who are trained with plyometric stride jump crossover = 10.28 while box jump plyometric training = 10.13, the level of significance α = 0.05 above, tcount = 0.55 is smaller than ttable = 1.68.

The results of submitting research hypotheses about the differences in the ability of athletes trained with box jump plyometrics to athletes with low achievement motivation show that the group of athletes who have low achievement motivation who are trained with the box jump plyometric training method is higher than the ability of athletes trained with plyometrics. stride jump crossover. The stride jump crossover plyometric training method will be more appropriate if those who have high achievement motivation are trying to improve their kicking skills. Whereas for those who have low achievement motivation, the box jump training method is more appropriate. This has proven to be a discovery in the field.

DOI: https://doi.org/10.21009/JIPES.051.06

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