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Comparison of the Effect of Single Leg Stride Jump and Stride Jump Crossover Training on Improving Straight Kick Results in the Sport Branch of Pencak Silat

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ABSTRACT

The research problem proposed by the author is to reveal the effect of plyometric single-leg stride jump and stride jump crossover training on the results of straight kicks. This is based on the problem that straight kicks require power because the movement requires strong and fast or explosive power. This research uses using experimental method. The sample used in this research was FPOK UPI students who took part in UKM pencak silat as many as 40 people using random sampling techniques. The sample was divided into two training groups by ranking. The results of data analysis showed that the t-count was 7.95, which was greater than the t-table of 1.684, so H_0 was rejected, meaning that there was a significant difference in the influence of the two forms of exercise. The results showed that single-leg stride jumps had a more significant influence compared to crossover stride jump training on improving straight kick results. The implications of the research results show that to increase the success of a straight kick as a strong and fast movement, you must have power abilities as part of your physical abilities. Single-leg stride jump training can be used as an alternative to increasing straight kick

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1. INTRODUCTION

Pencak Silat is a branch of martial arts that was originally born in the Malay community, especially in Indonesia. Pencak silat is only used to protect oneself from all threats and to fight against invaders. The definition of Pencak silat is a form of martial arts to defend life or a group from natural challenges, and disturbances from surrounding animals and humans. He always uses this method of self-defense. Why defend yourself? Because as living creatures we must maintain our survival, and escape various threats of death and extinction in our lives (Saleh: 1991).

Notosoejitno (2001: 7) explains that there are several aspects contained in pencak silat that can be applied in everyday life, namely; Pencak Silat as a sport aspect, Pencak Silat as a martial aspect, Pencak Silat as a cultural aspect, and Pencak Silat as an achievement aspect.

Pencak silat as an achievement sport requires supporting elements such as: physical, technical, tactical, and mental. Physical elements include strength, speed, flexibility, endurance, power, agility, and stamina. Meanwhile, technical elements such as punches, kicks, dodges, and throws. While the tactical element is a strategy that is applied when competing, the mental element is such as discipline, loyalty, motivation to practice, and teamwork. All these elements are arranged in a training program to improve athlete performance. (Ihsan et al., 2017; Latifah et al., 2017; Marwan, 2017; Mulyana, 2017; Prasetyo, nd; Saputra et al., 2017; Soo et al., 2018) .

In pencak silat, four categories are usually competed in, namely: the fighting category (fighting heroes), the singles category, the doubles category, and the team category. The category studied in this research is the fighting category (wiralaga). One of the technical elements contained in the sparring category of pencak silat sports is the kicking technique. There are four types of kicks commonly used in pencak silat competitions, namely crescent kicks (arc), straight kicks, side kicks (T), and back kicks (Soo et al., 2018).

Kicks are an effective attack technique for gaining points. The value of a kick that hits the target and is valid is two, therefore kicking techniques need to be trained effectively. One of the factors that influences the effectiveness of a kick is power (Ihsan et al., 2017).

If the kick is fast, strong, and accurate, the attack will be difficult for the opponent to anticipate, so that the kick can hit the target and a score can be achieved. One of the kicking techniques that the author will use in research is the straight kick. A straight kick is a type of front attack using the legs. According to Sucipto (2001: 54), "A straight kick is a kick that uses the base of the toes." The straight kick technique is as important as other kick techniques in carrying out attacks to gain points. A perfect straight-kick technique will support you in achieving victory in a match. The perfect meaning above is that the kick is efficient and effective. Attack and defense patterns with kicks will be effective if supported by good leg power. Based on observations in various pencak silat competitions, it is often found that athletes who perform straight kicks lack power, as a result, the attacks are less patterned and meaningless to the opponent, so they only stick to the opponent's guard.

This of course affects the assessment made by the jury, as a result, quite a few athletes fail to win a match. The assessment made by the jury is what is seen and heard from the *impact of an* attack. It is very important for athletes to master the straight kick technique supported by power to get points because the effect of a straight kick supported by power is that if it hits the target, the opponent will be knocked away. So the jury will assess the attack.

For this reason, a training method is needed that supports increasing power to support straight kick results.

Lubis (2004: 26) states about straight kicks as follows: "An attack that uses one foot and leg, the trajectory is forward with the body position facing forward, with impact on the base of the inner toes, targeting the heart and chin." The straight kick sequence begins with *sikap pasang* (I), a flexion movement in the groin joint (coxae articulation) (II) then extension (straightening) in the knee joint (genue articulation) (III). More clearly regarding the straight kick movement can be seen in Figure 1 below.



Figure 1. Sequence Of Straight Kick Movements (I,II,III)

The muscles that contract during flexion movements are m. semimembranosus, m. biceps femoris, m. semitendinosus, m. gracilis, m. gastrocnemius, m. peroneus longus, m. flexor hallucis longus, m. flexor digitorum longus, m. Achilles tendon, m. peroneus brevis. The muscles that contract during the knee joint extension movement or kicking are m. rectus femoris, m. vastus lateralis, m. vastus medialis, m. tibialis anterior, m. extensor digitorum longus, m. extensor hallucis longus. (Yusup *et al.*: 2002).

Power or explosive power according to Harsono (1988: 200) "is the ability of muscles to exert maximum strength in a very fast time". Then Bompa (1988: 273) said: "Power is the product of two abilities, strength, and speed". Bucher in Harsono (1988: 199) says that power is '... the ability to release maximum force in the shortest period of time'. So it is very clear that power is very necessary in performance sports, especially in pencak silat, when executing explosive punches or kicks. In an effort to increase power, O'Shea in Alfian (1999: 37) suggests that: Explosive power can be increased by (a) increasing muscle power by focusing on strength, (b) focusing on the speed of nerve stimulation and the speed of muscle contraction, (c) both, namely increasing the strength and speed of stimulation and speed of muscle contraction (Ismadraga & Lumintuarso, 2015; Ismoko & Sukoco, 2013; Mansur *et al.*, 2018).

To increase power in resistance training models, there are two training methods that are often used, namely (1) plyometric training, and (2) *weight training*. Power training will be more optimal if the two training models are combined. According to Early Radcliffe and Farentinos (2015) said: "... combining plyometric training with a weight-training program enhanced physical development far beyond that of weight-training programs alone. You can enhance strength and speed, and avoid injury with good combined programming ". Plyometric exercises are exercises that allow muscles to reach maximum strength in the shortest possible time. (Chu: 1992). Meanwhile, according to weight training, weight training

is systematic training where weights are only used as a tool to increase muscle strength in order to achieve various specific goals, such as improving physical condition, health, strength, performance in a sport, and so on. (Harsono, 1988: 185).

The training method studied was the plyometric training method, with the reason being that this training method only uses simple equipment or even no tools. The forms of plyometric training include vertical jump, squat jump, box jump, rocket jump, star jump, double leg butt kick, split jump, scissor jump, single leg stride jump, and crossover stride jump (Radcliffe & Farentinos, 2015). Of all the forms of exercise for the purposes of this research, the author only took two forms of exercise, namely single leg stride jump and stride jump crossover. Due to the similarity of muscle movements that work in the muscles supporting the straight kick movement. Apart from that, in terms of the form of the movements, there are also similarities. Training must be adjusted to the characteristics of the sport and the structure of the technical movements. According to Bompa in Harsono (1988: 110) "In order for specific motor activities to have a good influence on training, training must be based on the specifics of the sport".

These two forms of training (single-leg stride jump and stride jump crossover) will have a significant influence in terms of increasing power, especially to support the execution of straight kicks. However, it is necessary to examine carefully which form of training has a more significant influence on improving the results of straight kicks in pencak silat sports.

Plyometric concept the identifying feature of plyometric exercise is a lengthening (eccentric contraction) of the muscle-tendon unit followed directly by a shortening or concentric contraction, otherwise termed a stretch-shortening cycle (SSC). The SSC is integral to plyometric exercise because it enhances the ability of the muscle-tendon unit to produce maximal force in the shortest amount of time (Villarreal et al., 2012: 575). The plyometric training method with its single-leg stride jump and crossover stride jump training forms is considered appropriate for increasing the power of straight kicks. Chu (1992: 5) regarding plyometric training, namely: "Plyometrics training can take many forms, including jump training for lower extremities". Furthermore, Davies, et.al (2015:761) An important part of performance-based rehabilitation programs is the development of power often addressed by using plyometric exercises. Plyometric training is an exercise that emphasizes muscle contractions in the form of explosive power. In its working process, plyometric training is a reflex movement mechanism called "Stretch reflex". The operation of the stretch reflex is the same as the knee reflex movement, namely receptors (in muscle spindles) and effectors (muscle fibers) (Fatouros et al., 2000; Perez-Gomez et al., 2008; Makaruk & Sacewicz, 2010; Beneka et al., 2013; Struminger et al., 2013; Asadi, 2014; Davies et al., 2015; Lleshi, 2015).

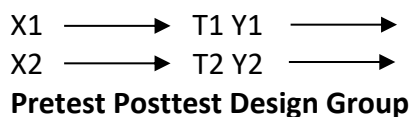
Single-leg stride jump and stride jump crossover training are almost the same, namely jumping upwards with the help of a bench that is 30 cm high. What is different about these two movements is the foot when landing, namely if the single leg stride jump lands with the foot in the starting position, while the crossover stride jump lands with the other leg because the jump crosses over the bench.

2. RESEARCH METHODS

The method used in this research is the experimental method. Arikunto (1992:31) said: "Experiment is a way to look for a causal relationship (causal relationship) between two factors that are deliberately caused by the researcher by eliminating/reducing other factors

that could interfere." Meanwhile, Sugiyono (1998: 4) argues that: "Experiment is research that seeks to find the influence of certain variables on other variables under strictly controlled conditions."

The research design that the author uses is a pre-test and post-test group design. The research design configuration is as follows :



Information :

X 1: Initial straight kick test

X 2: Initial straight kick test

Y 1: Final straight kick test trained on single-leg stride jump

Y 2: Final straight kick test trained on stride jump crossover

T 1: Treatment/ single leg stride jump training

T 2: Treatment/ step jump crossover training

The research population was FPOK UPI students who took part in the pencak silat UKM, numbering 100 people. Samples were taken from 40 people using a random sampling technique.

To determine groups A and B, each group consisting of 20 people, an initial test was first carried out, namely a straight kick test with the NU BOYA device. After the initial test data is obtained, ranking and matching are then carried out to form a sample that is more homogeneous in quality and quantity.

The measuring instrument that the author uses to measure the results of a straight kick is NU BOYA, with a validity level of 0.86 and a reliability of 0.92 (Yaya: 1995) from the results of testing the measuring instrument.

3. RESEARCH RESULTS AND DISCUSSION

3.1 Research result

The results of the data processing and analysis that the author will describe in detail are as follows:

Table 1
Calculation Results of Average Values and Standard Deviations

Variable Group	Initial Test		Final Test	
	\bar{X}	S	\bar{X}	S
Group A	58.7	4.22	63.5	3.95
Group B	58.85	3.96	62.1	4.11

Table 1 shows that the average initial test for group A (single leg stride jump exercise) was 58.7 and for group B (crossover stride jump) was 58.85. Meanwhile, the deviation for group A is 4.22, and group B is 3.96. The average initial test score for the two groups was almost the same due to dividing the sample before training into two groups with the same abilities. Meanwhile, the final test for group A was 63.5 with a standard deviation of 3.95, while for group B the final test was 62.1 with a standard deviation of 4.11.

The next step is to test and analyze the differences in the increase in training results from the two forms of exercise, whether the differences are significant or not. Using the significant difference test, the results of this test can be seen in Table 4.7 below:

Table 2
Significance Test Results of Differences in Improvement of the Two Forms of Exercise

Sample Group	t-count	t-table	Information
Group AB	7.95	1,684	Significant

From the test results above, it was found that t-count (7.95) was greater than $t_{1-\alpha}$ (1.68). The test criterion is to accept H_0 if $t \leq t_{1-\alpha}$ at the real level $\alpha = 0.05$ with $(dk) = 38$. In this case, the t-count is in the H_0 rejection area, so H_0 is rejected, which means there are differences between the two forms of training.

The conclusion is that there is a significant difference in the influence of the single-leg stride jump and crossover stride jump forms of training on improving the results of straight kicks in pencak silat sports. This means that the form of exercise is single leg stride jump. The effect is more significant compared to the stride jump crossover form of training in terms of increasing the results of straight kicks in pencak silat sports.

3.2 Discussion

The findings in this study were that the single leg stride jump exercise had a significant influence on improving straight kick results because this form of exercise had similar movements to the straight kick technique, namely the presence of flexion movements in the hip joint and extension movements in the knee joint. Apart from that, there are similarities in the muscles that contract in the single-leg stride jump exercise with the straight kick technique. Likewise, stride jump crossover training has a significant influence on improving straight kick results because there are similar movements and muscles that contract with the straight kick technique, however, the muscles that contract in stride jump crossover training are not as maximal as in single leg training. stride jump. This is because in the stride jump crossover exercise the movement alternates between the legs and there is a shift to the side so that the increase in power is not as significant as with the single-leg stride jump exercise. The next finding was that single-leg stride jump training had a more significant effect compared to crossover stride jump training on improving straight kick results. This happens because in single-leg stride jump training only the power component is trained, there are no other physical condition components so the increase in power is more significant. Meanwhile, in stride jump crossover training, apart from the trained power component, there is also an agility component as a result of turning the legs to the side when carrying out the movement. The similarities between the muscles that contract during the straight kick movement and the single leg stride jump and stride jump crossover exercises are divided into two stages, namely during the flexion movement, namely *m. semimembranosus*, *m. bicep femoris*, *m. semitendinosus*, *m. gracilis*, *m. gastrocnemius*, *m. peroneus longus*, *m. flexor hallucis longus*, *m. flexor digitorum longus*, *m. Achilles tendon*, *m. peroneus brevis*. The muscles that contract during the knee joint extension movement or kicking are *m. rectus femoris*, *m. vastus lateralis*, *m. vastus medialis*, *m. tibialis anterior*, *m. extensor digitorum longus*, *m. extensor hallucis longus*. (Yusup et al. : 2002). Apart from that, the results of this research are strengthened by the results of the author's interview with physical condition lecturers, namely Mr. Dikdik and Mr. Iman on March 29, 2007 in front of the FPOK hall. The results of the interview showed that the single leg stride jump exercise was carried out continuously (solidly) and explosively

so that the leg muscles worked quite hard as a result of which the over-compensation received by the muscles was higher compared to the crossover stride jump exercise where the movements involved alternating legs (distribution) and less explosive. The movement is less explosive because the sample is not optimal in pushing off because they have to move to the side and maintain body balance when pushing off. This will have an effect on increasing power as a support for executing straight kicks (Radcliffe & Farentinos, 2015).

4. CONCLUSIONS AND RECOMMENDATION

4.1 Conclusion

The single-leg stride jump training form has a more significant influence compared to the crossover stride jump training on improving straight kick results in the sport of Pencak silat.

4.2 Recommendation

Recommendation that the author can put forward regarding the results of this research are as follows:

For coaches, trainers, and athletes, especially in the pencak silat sport who will be doing single leg stride jump or stride jump crossover training, use a longer and stronger bench so that athletes can perform these movements optimally without having to worry about the fear of falling caused by the bench. sway. For future students or researchers, in examining the comparison of the effects of the two forms of plyometric training, use a sample of women. For future researchers, when carrying out kick or punch tests using the Nu Boya tool, apart from looking at the results of the kick on the tool, they also use a stopwatch to calculate the time for carrying out the movement so that the elements of strength and speed which are components of power can be studied.

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