INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND ANALYSIS

ISSN(print): 2643-9840, ISSN(online): 2643-9875

Volume 06 Issue 11 November 2023

DOI: 10.47191/ijmra/v6-i11-43, Impact Factor: 7.022

Page No. 5333-5338

The Effect of Interval Training 1:2 and 1:3 on Increasing the Speed of the Sickle Kick in Terms of Leg Muscle Power

Apriansah [1], Panggung Sutapa [2], Sumaryanti[3], Ali Satia Graha [4], Sumarjo[5], Ali Munir[6]

[1,2,3,4,5,6] Departement of Sport and Helath Sciences, Yogyakarta State University, INDONESIA.

ABSTRACT: The speed of the sickle kick is an important component in martial arts, which plays an important role in defensive and ffensive techniques on athletes. This study aims to find out: (1) the difference in the effect between 1:2 and 1:3 training on sickle kick speed; (2) the difference in the effect between athletes who have high and low leg power on the speed of the sickle kick; (3) The interaction between 1:2 and 1:3 interval training and high and low leg power on the speed of the sickle kick in IPSI athletes in Kendari City. This type of research is experimental research using a 2x2 factorial design. The population in this study was IPSI athletes in Kendari City which amounted to 38 people. The sample in this study amounted to 20 people who were then carried out ordinally paired and had been divided by 37% of the total population. A tool used to measure the speed of the sickle kick using the target speed and leg strength with a vertical jump. Data analysis was carried out using the two-way ANOVA method using SPSS software version 20.0, with a significance level of 5% or 0.05. The results showed that: (1) there was a significant difference in the effect between interval training of 1:2 and 1:3 on the speed of the sickle kick, as evidenced by a value of 6.283 with a significance value of 0.023 sig < 0.05. (2) There is a significant difference in the influence on the power ability of the limb on the sickle kick speed component, with a significance value of 0.001. (3) There was a significant interaction between 1:2 and 1:3 interval training on sickle kick speed in athletes, with a significance value of 0.042 sig < 0.05. So the conclusion of this study is that training with a ratio of 1: 2 and 1: 3, the level of leg power, and the interaction between the two significantly affect the speed of the sickle kick in IPSI athletes in Kendari City. These factors need to be considered in the planning and execution of training programs to improve the performance of athletes in terms of sickle kick speed.

KEYWORDS: Interval 1:2, Interval 1:3, Speed, Power Limbs, Sickle Kick.

I. INTRODUCTION

Pencak Silat is a traditional martial art that has rich and diverse historical roots, and is now recognized as a competitive and challenging sport around the world. The speed of the sickle kick in martial arts is one of the key components in effective defense and attack techniques. The high speed of the sickle kick allows an athlete to take the initiative in breaking the opponent's defense to get maximum points.

Pencak silat is a self-defense that has technical movements that are easy to learn so that it involves a component of the body in humans and also pencak silat sports have four aspects including mental spiritual aspects [1], martial aspects, art aspects and sports aspects. This is reinforced by [2] which states that the word silat contains the meaning of martial arts which has elements of terms-isilah, namely the word pencak means art performance and silat means battle in martial arts.

Steps that can be taken to achieve sporting achievements through ongoing coaching. Sport is one place to improve human resources, by exercising regularly and continuously will improve one's physical and mental quality. One of the sports that also conducts this coaching is pencak silat.

In pencak silat sparring techniques in an effort to achieve maximum results can use punches, kicks, also with welcome techniques, cutouts or falls accompanied by catches [3]. In pencak silat the kick technique is as important as the punch technique, but the kick has greater power than the power of the punch. Speed in martial arts is also needed in anticipating the opponent's attack [4]. One tactic that is often used in martial arts is the Speed target tactic [5]. When the opponent makes an attack, the fighter tries to dodge to the left, or to the right or retreat as soon as possible. Then followed by a counterattack using either punches or kicks. Therefore, the speed needs to be increased in the process of martial arts training. So, to become a

professional and accomplished pencak silat athlete must have good physical condition because physical condition is an initial benchmark to support technical, tactical, strategic and mental training [6].

Based on observations made by researchers, the kick speed possessed by IPSI athletes in Kendari City is still included in the category of lacking. In addition, speed is also influenced by several factors, one of which is in terms of leg power, with the maximum leg power will have a maximum level of speed. This can be seen from the results during the training process and matches that have been passed by athletes, athletes experience weakness in kick speed which can be seen in the observation of the pree-test athletes conducting speed target tests found that the average athlete can kick the target quickly and on target as much as ≤ 15 for men. So that the results of this fall into the category of less which results in the opponent first kicking. In line with this, speed is an indispensable component, especially in kicks in martial arts, because the element of speed can give points to athletes [7].

Speed is a very important component of motion especially in the sickle kick [8]. Because without the speed between the power of the limb and the target of the sickle kick will not produce optimal results, and vice versa if the speed created from the power of the limb on the sickle kick is very good, it will get maximum points or results [9].

In line with the problems that exist in the case study, things similar to the research examined by [10] in his research which examined the factors that influence, especially the level of speed on the sickle kick, it can be concluded that the speed component factor is very influential on the sickle kick, this is because the physical target can be a target board or without a target, namely into the air will affect the speed of the sickle kick on the martial arts athlete [11]. This is because first, physical targets affect the working conditions of athletes when kicking. Physical targets will be a stimulus in choosing the right strategy in athletes to control their motor. Both exercises with physical targets will exert explosive power in balancing the controllability of muscle strength and segmental speed. Third, speed is influenced by control accuracy [12]. Athletes will consider speed for accuracy/accuracy of targets. Athletes control target accuracy generally by reducing speed and range of motion, while simultaneously exerting maximum kicking muscle force.

The Sickle Kick is one of the kicks that can provide maximum points in the sparring championship [13]. However, in applying the kick, it is necessary to have supporting components, including speed and explosive power of the limbs, these two components are supporting components in the sickle kick [14]. If the two supporters are maximum, of course, in doing the sickle kick technique will be optimal too. Interval programs are created in relation to training time. During this time interval training with active recovery was shown to have many benefits, such as saving training time, burning calories in the body, as well as increasing strength, speed, and endurance and compared to other training systems, interval training was shown to be more effective and efficient in improving athlete performance [15].

1:2 and 1:3 interval training is an interval training method that uses a time ratio of 1:2 or 1:3. 1:2 interval training means a period of high-intensity exercise performed for 1 minute, followed by a period of low-intensity exercise for 2 minutes. 1:3 interval training means a period of high-intensity exercise performed for 1 minute, followed by a period of low-intensity exercise for 3 minutes. These two types of interval training can be used to improve the physical condition, strength, endurance, and speed of martial arts athletes. Interval training is one of the training methods that can be used to increase kick speed [16]. Interval training can be done by combining aerobic and anaerobic exercise in a ratio of 1:2 or 1:3 [17].

II. METHOD

This type of research is an experiment using a 2x2 factorial design. This experimental study used two groups that received different treatments, namely the provision of interval training 1: 2 and interval training 1: 3 and high leg muscle power and low leg muscle power, where this study was carried out at the Kendari City Sports Talent School with a total population of 38 athletes and the technique used was using purposive sampling.

Furthermore, from the total population, a vertical jump test was carried out which aimed to determine the high and low endurance possessed by the athlete and ranked with a limit of 27% of the upper group and 27% of the lower group. So with these results, we found a total sample of 20 athletes with a division of 10 athletes with high leg power and 10 athletes with low leg power.

The instruments used in this study were a leg muscle power test using a vertical jump and a sickle kick speed test using a speed target. As well as the data analysis technique used in this study using two-way ANAVA at the significance level of $\alpha = 0.05$ using the SPSS software program version 20.0 for windows with a significance level of 5% or 0.05.

III. RESULT

In this sub-chapter the results and discussion of this research will be presented sequentially, including: (1) Research data, (2) Analysis prerequisite tests, and (3) Hypothesis Tests. The following are the results of a descriptive analysis of the research that has been carried out

Table 1. 1:2 Interval Training Group – High Leg Muscle Power

Observation	*Min.*	*Max.*	*Mean*	*Median*	*Modus*	*Std. Dev*
Pretest	13,00	17,00	15,00	15.00	13.00	1,58
Posttest	15,00	20,00	17,80	18.00	18.00	1,79

Table 2. 1:3 Interval Training Method Group – High Leg Muscle Power

Observation	*Min.*	*Max.*	*Mean*	*Median*	*Modus*	*Std. Dev*
Pretest	15,00	17,00	16,20	15.00	15.00	0,84
Posttest	21,00	23,00	22,20	18.00	18.00	0,84

Table 3. 1:2 Interval Training Method Group – Low Leg Muscle Power

Observation	*Min.*	*Max.*	*Mean*	*Median*	*Modus*	*Std. Dev*
Pretest	14,00	16,00	15,00	16,00	16,00	0,71
Posttest	16,00	19,00	17,60	22,00	22,00	1,14

Table 4. 1:3 Interval Training Method Group – Low Leg Muscle Power

Observation	*Min.*	*Max.*	*Mean*	*Median*	*Modus*	*Std. Dev*
Pretest	12,00	15,00	14,00	14,00	14,00	1,22
Posttest	17,00	22,00	19,00	18,00	18,00	2,00

Table 5. Average Comparison of Each Group

No	Group	Average Pretest	Average Posttest	Increased
1	Training Interval 1:2 – High	15,00	17,80	2,8
2	Training Interval 1:3 – High	16,20	22,20	6
3	Training Interval 1:2 – Low	15,00	17,60	2,6
4	Training Interval 1:3 – Low	14,00	19,00	5

Table 6. Normality Test

Group	Sickle Kick Speed	Sig.	Information
Interval Training 1:2 – High Leg Muscle Power	Pretest	0,967	Usual
	Posttest	0,238	Usual
Interval Training 1:3 – High Leg Muscle Power	Pretest	0,314	Usual
	Posttest	0,314	Usual
Interval Training 1:2 – Low Leg Muscle Power	Pretest	0,325	Usual
	Posttest	0,814	Usual
Interval Training 1:3 – Low Leg Muscle Power	Pretest	0,146	Usual
	Posttest	0,440	Usual

Table 7. Homogeneity Test

Data	**Group**	Sig.	**Information**
Sickle Kick Speed	Interval Training 1:2 – High Leg Muscle Power	0,364	**Homogen**
	Interval Training 1:3 – High Leg Muscle Power		
	Interval Training 1:2 – Low Leg Muscle Power		
	Interval Training 1:3 – Low Leg Muscle Power		

Table 8. Test the hypothesis

Treatment	F_{count}	*Sig.*	**Information**
Method	6,283	0,023	Significant
Power Limbs	18,283	0,001	Significant
Exercises*Leg Power	4,891	0,042	Significant

IV. DISCUSSIONS

Based on hypothesis testing, it is known that there is a significant difference in influence between the 1:2 training interval and the 1:3 training interval of sickle kick speed. The 1:3 interval training group was higher (good) than the 1:2 interval training group on sickle kick speed. According to the analysis of both training programs, 1:3 interval training involves longer recovery and muscle strength and execution will make the athlete more optimal in performing the fast sickle kick technique.

The physical condition of martial arts athletes will affect the speed or failure of the sickle kick [18]. In accordance with the results of this study where applying interval training will improve the physical condition of athletes because it involves intermittent exercise with high intensity alternating with lower intensity activities for recovery or rest [19]. With the high intensity of training, it will burden the athlete so that it makes adaptations to the body that will experience an increase in physical condition [20]. As for the speed of the sickle kick, it is very important for fighters to get high points [21].

Interval training is an exercise that has a very effective effect on improving cardiorespiratory fitness, cardiofacial function, antopometery, muscle structure and function, reducing fatigue and depression [22]. As for this study, using 1:2 training interval and 1:3 training interval has a good effect in increasing sickle kick speed, but 1:3 training interval is better. This is because 1:3 interval training has a longer rest period to return to exercise, so it will make concentration in doing exercise movements better [23]. In addition, 1:3 interval training will make it easier for athletes to learn movements that are difficult to master [11].

The results of the analysis of research data showed that there was a significant difference in the effect of leg muscle power on the speed of the sickle kick. It can be known that high leg muscle power produces better sickle kick speed compared to low leg muscle power. This means that increasing the speed of the sickle kick requires mastery of abilities with high leg muscle power.

In line with this research, supported by [16] which shows that there is a contribution of leg muscle power to the speed of the sickle kick, this is because when doing a sickle kick to hit an object requires focus, power and speed in kicking. Another study revealed by [17] that by strengthening leg muscle power and balance will have a good effect in terms of speed of doing sickle kicks, as for other factors, such as individual techniques such as mastery of high techniques automatically, thinking skills, emotional stability and high willpower, in addition to physical condition factors such as strength, endurance, flexibility, Balance and accuracy can also determine whether or not it is good in terms of sickle kick speed.

The results of the analysis proved that there was a significant interaction between 1:2 interval training and 1:3 interval training as well as leg muscle power (high and low) on sickle kick speed. This can be interpreted that if there is an interaction between the 1:2 interval and the 1:3 interval and the power of the leg muscles (high and low) against the speed of the sickle kick. The results showed that the 1:3 interval training method is a more effective method used for students who have high and low leg muscle power. This is because interval training 1: 3 at the time of implementation provides a longer recovery after doing training with heavy loads so that the muscles will adapt more quickly so as to increase muscle strength and power in the muscles which will affect the speed of movement.

Good limb muscle power is one of the basic components for performing sickle kicks in martial arts. The existence of leg muscle power plays an important role in achieving good sickle kick technique quality. The speed of the sickle kick in sports requires strength to support the success of the kick to hit the target.

V. CONCLUSION

From the results of this study, there was a significant difference in the effect between interval training of 1: 2 and 1: 3 on the speed of the sickle kick, as evidenced by a value of 6.283 with a significance value of 0.023 sig < 0.05. In addition, there is a

significant difference in the influence on the power ability of the limb on the sickle kick speed component, with a significance value of 0.001. And there was a significant interaction between 1:2 and 1:3 interval training on sickle kick speed in athletes, with significance values being 0.042 sig < 0.05. So the conclusion of this study is that training with a ratio of 1: 2 and 1: 3, the level of leg power, and the interaction between the two significantly affect the speed of the sickle kick in IPSI athletes in Kendari City. These factors need to be considered in the planning and execution of training programs to improve athletes' performance in terms of sickle kick speed.

REFERENCES

1) M. Zakky Mubarok and Y. Kharisma, "Pengaruh Latihan Interval Terhadap Peningkatan Kapasitas VO2Max," *Biormatika J. Ilm. Fak. Kegur. dan ilmu pendiidkan*, vol. 8, no. 1, pp. 128–136, 2022, [Online]. Available: http://ejournal.unsub.ac.id/index.php/FKIP
2) A. Rahman and Sugiarto, "Meningkatkan Kecepatan Lari 100 Meter Dengan Latihan Interval 1 Banding 2 Dan 1 Banding 3," *J. Sport Sci. Fit.*, vol. 04, no. 1, pp. 1–6, 2017.
3) Sumintarsih, T. Saptono, H. Mustofa, and L. Indriharta, "Perbandingan Circuit Training Dan Interval Training Terhadap Vo2 Max Dengan Indeks Massa Tubuh Pemain Bola Voli," *J. Cahaya Mandalika*, pp. 687–696, 2022.
4) A. N. Warthadi, R. Budianto, N. Subekti, M. Fatoni, and N. Nurhidayat, "Intervensi Latihan High Intensity Interval Training Terhadap Strength Endurance Olahraga Pencak Silat (Ekstrimitas Bawah)," *Jambura Heal. Sport J.*, vol. 4, no. 2, pp. 139–147, 2022, doi: 10.37311/jhsj.v4i2.15811.
5) M. Z. Mubarok and Y. Kharisma, "Perbandingan Metode Latihan Interval Ekstensif dan Intensif Terhadap Peningkatan Daya Tahan Aerobik," *Phys. Act. J.*, vol. 3, no. 1, p. 77, 2021, doi: 10.20884/1.paju.2021.3.1.4813.
6) Mardiana, A. Kartini, and B. Widjasena, "Intensitas Latihan Interval dan Aktivitas Antioksidan Endogen," *Pemberian Cairan Karbohidrat Elektrolit, Status Hidrasi dan Kelelahan pada Pekerja Wan.*, vol. 46, no. 14, pp. 6–11, 2012.
7) A. Romadona, "Pengaruh Latihan Fartlek Dan Interval Training Terhadap Kemampuan Daya Tahan Pada Pemain Ssb Roked Gresik U-17 Tahun," *J. Prestasi Olahraga*, vol. 4, no. 1, pp. 73–79, 2021.
8) N. Hernawan, A. Rohendi, and G. Kardani, "Perbandingan Pengaruh Metode Latihan Tabata Dengan Metode High Intensity Interval Training Terhadap Hasil Daya Tahan Kardiovaskular Pemain Sepakbola," *J. Keolahragaan*, vol. 7, no. 2, p. 30, 2021, doi: 10.25157/jkor.v7i2.5663.
9) M. Arfa and H. D. Parlindungan, "Meningkatkan Kecepatan Lari 100 M Dengan Latihan Interval 1 Banding 2 Dan 1 Banding 3," *J. Pedagog. Keolahragaan*, vol. 1, no. 2, pp. 69–78, 2015.
10) S. Hardiansyah, "Pengaruh Metode Interval Training Terhadap Peningkatan Kesegaran Jasmani Mahasiswa Jurusan Pendidikan Olahraga," *J. Penjakora*, vol. 4, no. 1, pp. 83–92, 2017.
11) R. Aryuanto, "Pengaruh Latihan Rope Jump Selama 20 Detik Dengan Metode Interval Training 1 : 5 Terhadap Kekuatan Otot Tungkai," *J. Kesehat. Olahraga*, no. 2, 2016.
12) A. Hariyanto and A. Pramono, "Rasio kerja dan istirahat: optimalisasi peningkatan latihan fisik untuk meningkatkan power otot tungkai," *J. Sport. J. Penelit. Pembelajaran*, vol. 6, no. 3, pp. 550–560, 2020.
13) F. F. Akbar Fachmi, "Pengaruh Latihan Rope Jump Selama 20 Detik Dengan Metode Interval Training 1:5 Terhadap Daya Tahan Aerobik," *e-journal Kesehat. olahraga*, vol. 06, no. 2, pp. 0–4, 2016.
14) S. Sunjoyo, S. sakti Rumpoko, M. Sholeh, J. Sulistyono, V. S. Sistiasih, and R. A. Wijayanti, "Sosialisasi Penyusunan Program Latihan High Intensity Interval Training Untuk Meningkatkan Kebugaran Jasmani," *Proficio*, vol. 4, no. 2, pp. 1–7, 2023, doi: 10.36728/jpf.v4i2.2621.
15) W. Fauzia, A. Khumaeroh, A. Picessa, S. Rspad, and G. Soebroto, "Profil Hemodinamik Pada Soccer Pria Pra Lanjut Usia Selama Masa Latihan High Intensity Interval Training (Hiit)," *J. Telenursing*, vol. 5, no. 2, pp. 2039–2049, 2023, [Online]. Available: https://doi.org/10.31539/joting.v5i2.7237
16) H. Prasetyo, "Pengaruh Latihan Ladder Drill Dengan Interval 1:2 Dan 1:3 Terhadap Kecepatan dan Kelincahan Atlet Bola Basket CLS Kelompok Umur 14 Tahun," *J. Prestasi OLahraga*, vol. 2, no. 1, pp. 1–9, 2019, [Online]. Available: https://jurnalmahasiswa.unesa.ac.id/index.php/8/article/view/31196
17) M. D. Kurniawan and M. Pudjianto, "Perbedaan Latihan Interval, Sirkuit Training, dan Lari Jarak Jauh terhadap Peningkatan Kebugaran Aerobik pada Atlet Bola Basket di MAN 2 Semarang," *J. Kesehat.*, vol. 10, no. 1, p. 40, 2017, doi: 10.23917/jurkes.v10i1.5491.
18) A. Rofiq and S. P. Pelamonia, "Pengaruh Interval Training 1 : 1 Dan 1 : 2 Terhadap Peningkatan Kemampuan Daya Tahan Jantung," *Semin. Nas. Has. Ris. dan Pengabdi.*, pp. 254–262, 2023.
19) H. Rustiawan, "Pengaruh Latihan Interval Training Dengan Running Circuit Terhadap Peningkatan Vo2Max," *J. Wahana*

Pendidik., vol. 7, no. 1, p. 15, 2020, doi: 10.25157/wa.v7i1.3108.

20) F. Alfahsyada and T. Jatmiko, "Penerapan Program Latihan Fisik Atlet Putri Bolavoli Porprov Kabupaten Kediri 2023," *Indones. Strength Cond. Coach. J.*, 2023.
21) A. Kustoro, "Pengaruh Latihan Hollow Sprints Dengan Interval Training Ratio 1 : 3 Dan 1 : 5 Terhadap Kecepatan dan Power Otot Tungkai," *J. Pendidik. Kahuripan*, vol. 1, no. September 2018, pp. 164–182, 2018.
22) M. F. S. Budi, "Circuit Training Dengan Rasio 1:1 Dan Rasio 1:2 Terhadap Peningkatan Vo 2 Max," *J. Sport Sci. Fitnes*, vol. 4, no. 3, pp. 53–58, 2018, [Online]. Available: http://journal.unnes.ac.id/sju/index.php/jssf
23) B. Indrayana, "Perbedaan Pengaruh Latihan Interval Training dan Fartlek terhadap Daya Tahan Kardiovaskular pada Atlet Junior Putra Taekwondo Wild Club Medan 2006/2007.," *J. Cerdas Syifa*, vol. 1, no. 1, pp. 1–10, 2021, [Online]. Available: https://online-journal.unja.ac.id/index.php/csp/article/view/699