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The Effect of Resistance Band and Ankle Weight Training Toward Speed of Mawashigeri Jodan Kicks for Semarang Inkai Athletes

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ABSTRACT

The speed of the mawashigeri jodan kick is an important factor for athletes who excel because it can produce high points. This study aims to determine which training method is more effective between training using resistance bands and ankle weights on the speed of the mawashigeri jodan kick in Inkai athletes in Semarang City. The research sample consisted of 30 athletes aged 11-14 years, who were then divided into 2 groups with the A-B-B-A technique, namely the resistance band group and the ankle weight group. This study used a quantitative approach with an experimental method. The research instrument was a measurement of the mawashigeri jodan kick for 30 seconds. The results showed that training with resistance bands provided an average increase of 27.64%, higher than training using ankle weights, which only reached an average of 25.94%.

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A. Conception and design of the study;
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INTRODUCTION

Sports are an effective and safe option to improve physical fitness and health. Essentially, humans exercise to achieve a certain level of physical fitness, utilising their free time productively, and enhancing self-defence abilities through martial arts. Coaching for this activity is carried out by the parent organisation of each sport, both at the regional and national levels, especially in the field of martial arts such as karate (Sari et al., 2020). Karate is a martial art from Japan that originated from fighting training, which was then transformed into an art form and sport (Yudhistira & Tomoliyus, 2020). Karate is one of the fields in empty-handed martial arts that is increasingly popular in Indonesia under the auspices of an organisation called FORKI (Indonesian Karate-Do Sports Federation). The development of karate in Indonesia follows the progress of the

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times, which continues to increase from year to year. It can be seen from the emergence of regional athletes who can achieve achievements at national and international levels(Prasetya Adi, 2024). An athlete to achieve high achievements requires the right training method, careful planning, and optimal physical condition(Prayoga, 2023). Physical condition is the main supporting factor that encourages the development of karate skills in kihon, kumite, and kata(Purba et al., 2024), as well as kumite (sparring).

In the match category, kumite is dominant in the speed component. One of them is the kicking technique, mawashigeri jodan, one of the attack techniques that gives high points. Points can be earned through kicks mawashi geri if the athlete masters the technique, speed, strength, and correct timing, as well as good execution; this kick becomes a potential weapon in karate. This kicking technique is a kick from below, carried to the side from the outside to the inside, sliding in a curved shape (Shalahudin & Sifaq, 2023). Mastering the technique properly and correctly is important to create a kick that is agile and right on target and makes it difficult for the opponent to block or avoid it, so the ability to coordinate movements is needed so that a single, correct kicking movement is displayed (Yulianti et al., 2024). If an athlete in a karate match wants to get high points in a short time, they usually look for points by doing kicks mawashigeri jodan towards the opponent's head with a quick movement and timing right (Shalahudin & Sifaq, 2023).

Semarang City has several karate schools, one of which is the Inkai School. Researchers conducted research in 2 dojos, which are under the auspices of Inkai Semarang City. Here are 2 dojos, namely, dojo Permata and dojo Bina Insani, this is aimed at overcoming the obstacles that occur. After the researcher conducted observations and carried out a trial kick test, mawashi geri jodan, which was carried out on 30 athletes using the PAN Kick on Thursday, February 26, 2025, as follows.

Table 1.
Kick Norm Reference assessment

Mark	Group	Son	Daughter
5	Very well	>25	>23
4	Good	20-24	19-22
3	Enough	15-19	14-18
2	Not Enough	10-14	8-13
1	Less Than Once	>9	>9

(Santi Septiyani et al., 2005)

Table 2.
Observation

No	Code	Number of kicks	Category	No	Code	Number of Kicks	Category
1	L01	20	Good	16	P16	19	Good
2	L02	18	Enough	17	P17	19	Good
3	L03	18	Enough	18	P18	17	Enough
4	L04	17	Enough	19	P19	17	Enough
5	L05	16	Enough	20	P20	15	Enough
6	L06	14	Not Enough	21	P21	15	Enough
7	L07	18	Enough	22	P22	22	Good
8	L08	18	Enough	23	P23	22	Good
9	L09	18	Enough	24	P24	20	Good
10	L10	17	Enough	25	P25	20	Good

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No	Code	Number of kicks	Category	No	Code	Number of Kicks	Category
11	L11	16	Enough	26	P26	19	Good
12	L12	15	Enough	27	P27	18	Enough
13	P13	22	Good	28	P28	17	Enough
14	P14	20	Good	29	P29	16	Enough
15	P15	20	Good	30	P30	15	Enough

Execution of the kick mawashi geri jodan using a punching bag target as high as the athlete's head, with the results of the kick speed level still not considered good. After conducting observations and interviews with the coach, This is because athletes only practice kicking mawashigeri jodan in the same way repeatedly athletes tend to experience a decline in performance due to boredom, lack of training aids, training variations, and not having a training program so that athletes have difficulty developing their kicking abilities mawashi geri jodan. Why is it said that the mawashi geri jodan kick in athletes who have been observed is still not good, this is to the kick speed criteria where to achieve good criteria according to (Santi Septiyani et al., 2005) for female athletes 19-22 and male athletes 20-24, while to achieve the criteria of very good female athletes must get a score >23 and male athletes must get a score >25. Based on the description of the observations above, the researcher wants to provide a training trial that can be used as a solution to increase speed with the right method. By having structured training with a well-planned program, trainers can organise training components appropriately. This will make it easier for coaches to decide on the strategic peak training moments for the championships they are focusing on, among the various major championships (Purnomo, 2019).

Previous research on the development of karate kick speed was carried out using a method with tools skipping, which shows that the training can increase the agility of karate athletes in upper kicks. (Saputra & Purbodjati, 2022). Another study of drill exercises in an effort to increase kicking speed, mawashi geri has a significant influence (Manullang & Tambunan, 2020). If we look at previous research that used tools skipping and drilling, certainly not a wrong method, but with the increasing innovation of sports equipment, variation in training becomes important to take advantage of these developments. Although tools like ankle weights and resistance bands are not innovations in training, their use remains relevant.

A Resistance Band is a sports tool made of elastic rubber, which functions to provide additional load to the movements being performed. (Fajar Ramadhan, 2023). According to (Narita Devi et al., 2022) this study used a type of resistance band with a resistance type of 15-35 lbs with a size: 2080x4.5x13mm and a weight of 87 grams with a resistance level that the researcher used of 15-35 lbs (7.5-17.5 kg) which is the optimal amount of tension for high repetitions in strengthening exercises that target the upper and lower body muscle groups.

Ankle weight is a foot-weight tool made of cloth weighted with iron powder. In this exercise, the weight is placed on the ankle and is done repeatedly. (Gustia Lestari1, Yasir Arafat2, 2023). Muscle strength will be achieved when a muscle receives repeated stimulation, resulting in a level of energy that exceeds the normal capacity of the muscle

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(Oktavianus et al., 2024). In the study, a 0.5 kg load was used as recommended for adolescent students in weight training, which can be done for 8-14 repetitions (Permana et al., 2023)

Increasing kicking speed requires a more effective training method. If you want to get an effective training method, you need to put together a structured training program, considering that each training method has its advantages and disadvantages. Therefore, the more structured the training method used, the more effective the training will be in achieving the desired goals (Ilahi et al., 2023) by considering the characteristics of each sport, time availability, and the circumstances and needs of each athlete, carried out scientifically.. According to Josef Nossek in (Yulianti et al., 2024) the principles of speed training include a volume of 3-4 sets, for repetitions of 10-16 repetitions, a frequency of 2-4 times, intervals between repetitions(recovery)more than 90 seconds while the interval between series/sets is 90 seconds-6 minutes(active). This is by the research results (Permana et al., 2023), training with weights with repetitions of more than 10 to increase speed. According to Sajoto M 1998 in (Wardana, 2017), a training frequency of 3-5 times a week is quite effective. When determining the training frequency, it is important to pay attention to a person's limits and ensure that they are not forced to adapt faster than their abilities. Thus, the kick mawashi geri jodan, if the application is correct, then in the match, the kumite athletes can earn points. However, based on the observations that researchers have made, there are still factors that need to be improved to maximize the results of the kick mawashi geri jodan. This research was conducted based on the needs of athletes, especially in kicking techniques mawashi geri jodan.

METHODS

The type of research used by researchers is quantitative. According to Sugiyono 2019 in(Asiva Noor Rachmayani, 2020) quantitative research is research in the form of numbers and analysis using statistics. This study uses an experimental method. According to (Firmansyah et al., 2021) experimental research is used to find the influence of treatment. The acquisition of treatment can be known with more accurate results because they can be compared with the conditions before treatment was given. In this method, there is treatment, then observed to prove the effect of the treatment on the results resulting from the treatment (Arib et al., 2024). The design used in this study is the Two-Group Pretest-Posttest Design. A sample of 30 Inkai karate athletes from Semarang City was divided into 2 experimental groups. Before it is done, treatment is first given a kick pretest mawashi geri jodan to obtain preliminary data. Then, given training treatment resistance band and ankle weight, as many as 16 meetings according to Bompa 1994 in (Izzuddin et al., 2024), giving treatment in this research experiment, 16 meetings were conducted, because this number was considered sufficient to produce changes. Frequency: 3 times a week, with a duration of 90 minutes. The final test or posttest aims to see the effect after the treatment is carried out. The research data were analysed using the requirement test, namely the normality test, hypothesis test,

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homogeneity test, and N-Gain Score using SPSS version 26.

The grouping procedure is done by sorting the initial test results from the highest to the lowest. In order to make it easier to ensure that the desired targets and results are in line with expectations, the researcher used subject-matching ordinal pairing. In this design, the sample will be divided into two groups according to the ranking from the highest pretest to the lowest with an A-B-B-A pattern.

RESULTS AND DISCUSSION

The initial data results of the Semarang Inkai Athletes were conducted before providing treatment to the subjects. Treatment was given for 16 meetings by implementing a resistance band and ankle weight. Next, the final data collection is carried out. This research is presented with the results pretest and a posttest, which uses the instrument 3 times for 30 seconds, with data collection in the form of as many kicks as possible and the kicks obtained mawashigeri jodan with the right technique. The following are the data results pretest and posttest, which were conducted on 30 samples of male and female athletes from Inkai Athletes in Semarang City, and were carried out before and after being given treatment.

Table 3.
Mean

No	Exercise	Pretest	Posttest
1.	Resistance Band	51,53	64,93
2.	Ankle Weight	51,73	64,26

Normality Test

The data normality test in experimental research is a requirement before carrying out hypothesis testing. In this study, a data normality test was used pretest and posttest using a kick instrument mawashigeri jodan by using the test Shapiro-Wilk with the help of SPSS Software version 26. If the test guidelines are carried out normally distributed if the significance > 0.05; if the significance value is < 0.05, then the distribution is not normally distributed. The results of the normality test data for the kick test mawashigeri jodan in Semarang Inkai athletes can be observed as follows:

Table 4.
Normality Test

	Shapiro Wilk	
	Resistance Band	Ankle Weight
Pretest	0,850	0,322
Posttest	0,591	0,304

Based on the data presented in the table above, it can be concluded that the pretest and posttest results in the resistance band and ankle weight groups of Semarang Inkai athletes. In the mawashigeri jodan trial test, when the pretest with a resistance band was 0.850 > 0.05, the significance value of the resistance band posttest results reached 0.591 > 0.05. In the pretest trial with ankle weight of 0.322 > 0.05, the value of the posttest

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significance was 0.304 > 0.05. The data was declared normally distributed according to the test criteria.

Homogeneity Test

Homogeneity testing was conducted to determine the variance of mawashigeri jodan kicking ability data from groups using resistance bands and ankle weights that had similarities, both in pretest and posttest data. The results of the homogeneity test calculation in this study are displayed in the data presented:

Table 5.
Homogeneity Test

		Levene Statistic	Df1	Df2	Sig.
Posttest	Based on the Mean	0,189	1	28	0,667
	Based on the Median	0,195	1	28	0,662
	Based on Median and with adjusted df	0,195	1	27,711	0,662
	Based on the trimmed mean	0,229	1	28	0,636

Based on the table of homogeneity test results above, namely a significance value of 0.667 > 0.05, it can be concluded that the data that has been tested is declared homogeneous.

Hypothesis Test

Hypothesis testing is used to determine the effect of resistance band and ankle weight training on the speed of mawashigeri jodan kicks. This study uses a paired sample T-test. If the probability is <0.05, then the H_o is accepted. If the probability > 0.05, then H_a is rejected.

Table 6.
Hypothesis Test Resistance Band

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pretest-Posttest	-4.733	0,594	0,153	-5,062	-4.405	-30.882	14	0,000

Based on the results of the normality test in the table above, it was obtained that Sig. (2-tailed) 0.000 <0,05 and because the t-count 30.88> t-table = 21788 and the significance value between <0.05, then H_o is rejected, which means that there is a significant influence of resistance band training on the speed of the mawashigeri jodan kick of Inkai athletes in Semarang City.

Table 7.
Hypothesis Test Ankle Weight

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Pretest-Posttest	-4.200	0,941	0,243	-4,721	-3,679	-17,284	14	0,000

From the calculation table of the results above, it was obtained that Sig (2-tailed)

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0.000 < 0.05 with a t-count value of 17.284> t-table = 21788 and a significance value of <0.05, so H_o was rejected, which means that there is a significant influence of ankle weight training on the speed of the mawashigeri jodan kick of Inkai athletes in Semarang City.

This study shows a significant effect of using resistance bands and ankle weights to increase the speed of the mawashigeri jodan kicks of Inkai athletes in Semarang City. A pretest was conducted before treatment to measure initial conditions. After treatment, the average kick speed value increased from 51.53 to 64.93 for the resistance band group, then 51.73 in the ankle weight group to 64.26. The data from the normality test results showed that the data tested was normally distributed, while the paired sample T-test hypothesis test produced a significance value of 0.000 <0.05, so H_o rejected that there is influence and H_a accepted to prove the significant impact of resistance band and ankle weight training on mawashigeri jodan kick speed. The conclusion from the data above is that the use of resistance bands and ankle weights both have a significant effect on the speed of the mawashigeri jodan kick of Inkai athletes in Semarang City, but resistance band training has a greater effect. The results of the t-test showed a value of 30.882 for resistance bands and 17.284 for ankle weights, with a difference of 13.598. The average post-test value of resistance band training was also higher at 64.93 compared to ankle weight at 64.26. The findings in this study are by previous research which stated that training using resistance bands and ankle weights can improve the kicking ability of martial arts athletes ("The Effect of 'Ankle Weight' And 'Resistance Band' Training On Increasing Kick Speed of Nare Chagi Athletes Club Taekwondo Harapan Jaya Lampung," 2022).

CONCLUSION

Training objectives need to be designed by considering the specific and measurable abilities of each athlete, both in the short and long term. This is important so that the program that is prepared goes well. The training program stage itself is divided into 3 parts, namely the observation stage which aims to identify the needs of athletes, then at the program stage, where athletes are asked to carry out the training program that has been designed by the trainer, the evaluation stage aims to determine the effectiveness and efficiency of the training program that has been carried out. Having a training program that has been designed regularly can help athletes achieve their best performance. With the training carried out in the right order, the training can run smoothly, namely, the training begins with warming up, then continues with core training, and finally, cooling down. Weight training is a structured process using weights as a means to optimise explosive power to achieve goals such as improving fitness, health, strength, speed, and athletic performance. A resistance band is used in a way that is attached to the ankle and provides a load on the leg used for kicking mawashigeri jodan. The resistance band is strong, elastic, and long enough not to hurt the knee joints when used. In addition, training with rubber

weights on the feet can also increase the motivation and reaction speed of athletes when kicking. This exercise is an exercise that relies on leg power, which can then have an effect on increasing power if done effectively according to the training program. A resistance band shape is used to give weight to the leg and tie it to the ankle, then the athlete kicks mawashigeri jodan by using the resitance kick that is installed on the foot that will be used for kicking must be strong, elastic, and long enough so that when used it does not injure the athlete. In addition, training with rubber weights on the feet can increase the athlete's motivation and response to kicking quickly.

REFERENCES

Arib, M. F., Rahayu, M. S., Sidorj, R. A., & Afgani, M. W. (2024). Experimental Research Dalam Penelitian Pendidikan. Innovative: Journal Of Social Science Research, 4(1), 5497–5511. https://j-innovative.org/index.php/Innovative/article/view/8468

Asiva Noor Rachmayani. (2020). No 主観的健康感を中心とした在宅高齢者における 健康関連指標に関する共分散構造分析Title.

Fajar Ramadhan, Z. (2023). Pengaruh Latihan Resistance Band Dan Latihan Beban (Barbel 1Kg) Terhadap Power Otot Lengan Pada Atlet Taekwondo Pesawaran Provinsi Lampung. Jurnal Penjaskesrek, 10(1), 38–48. https://doi.org/10.46244/penjaskesrek.v10i1.2135

Firmansyah, M., Masrun, M., & Yudha S, I. D. K. (2021). Esensi Perbedaan Metode Kualitatif Dan Kuantitatif. Elastisitas - Jurnal Ekonomi Pembangunan, 3(2), 156–159. https://doi.org/10.29303/e-jep.v3i2.46

Gustia Lestari1, Yasir Arafat2, M. E. C. L. (2023). Pengaruh Latihan Ankle Weight Terhadap Kecepatan Tendangan Sabit Atlet Pencak Silat Remaja Perguruan Rajawali Bangka. Jurnal Dunia Pendidikan, 4(November), 1–11. https://jurnal.stokbinaguna.ac.id/index.php/JURDIP

Ilahi, B. R., Okilanda, A., Raibowo, S., Yarmani, Sugihartono, T., Syafrial, Nopiyanto, Y. E., Hiasa, F., Ihsan, N., & Putra, J. (2023). The Effect of Resistance Bands Rubber Spring Exercise on the Front Kick Speed of Adolescent Pencak Silat Women. International Journal of Human Movement and Sports Sciences, 11(2), 418–423. https://doi.org/10.13189/saj.2023.110219

Izzuddin, D. A., Gemael, Q. A., Karawang, U. S., Barat, J., Hs, J., Waluyo, R., Timur, T., & Barat, J. (2024). Pengaruh Latihan. 4(3), 627–639.

Manullang, J. G., & Tambunan, G. K. (2020). The Effect of Drill Exercise Against Speed Kick of Mawashi Geri on Karateka Extracurricular at SMP Negeri 4 of Palembang. 443(Iset 2019), 71–72. https://doi.org/10.2991/assehr.k.200620.013

Narita Devi, S., Fauzi, F., Sukamti, E. R., Tirtawirya, D., & Prabowo, T. A. (2022). The Effect of 8 Weeks of Training with Resistance Band on Limb Power of Taekwondo Athletes. International Journal of Multidisciplinary Research and Analysis, 05(12), 3498–3502. https://doi.org/10.47191/ijmra/v5-i12-27

Oktavianus, L. G., Setiakarnawijaya, Y., & Resmana, D. (2024). Perbandingan Latihan Kekuatan Resistance Band dan Dumbbell terhadap Hasil Shooting Jarak 6 Meter Cabang Olahraga Petanque. Harmoni Pendidikan: Jurnal Ilmu Pendidikan, 1(4), 124–136.

Permana, F. R., Supriatna, & Yulingga Nanda Hanief. (2023). Pengaruh Latihan Menendang Menggunakan Beban Ankle Weight Terhadap Peningkatan Kecepatan Tendangan Depan Siswa Ekstrakurikuler Pencak Silat Di Mtsn 4 Blitar. Journal Sport Science Indonesia, 2(2), 173–186. https://doi.org/10.31258/jassi.2.2.173-186

Prasetya Adi, R. A. (2024). Tingkat Kondisi Fisik Cabang Olahraga Karate Universitas Neger Surabaya. JPO: Jurnal Prestasi Olahraga, 7, 96–101.

Prayoga, W. (2023). Pengaruh Resistance Bands Terhadap Peningkatan Power Pukulan Gyaku Tsuki Pada Atlet Karate. Journal Of Physical Education, 4(1), 35–41. http://jim.teknokrat.ac.id/index.php/pendidikanolahraga/article/view/2696%0Ahttp://jim.teknokrat.ac.id/index.php/pendidikanolahraga/article/download/2696/888

Purba, P. H., Rahayu, T., Kusuma, D. W. Y., Handayani, O. W. K., Suganda, M. A., Suryadi, D., & Manullang, J. G. (2024). Development of a Test Instrument for Physical Assessment in Junior Karate Practitioners: A Study Targeting 16-17-Year-Old Individuals. International Journal of Human Movement and Sports Sciences, 12(2), 277–287. https://doi.org/10.13189/saj.2024.120202

Purnomo, E. (2019). Pengaruh Program Latihan terhadap Peningkatan Kondisi Fisik Atlet Bolatangan Porprov Kubu Raya. JSES : Journal of Sport and Exercise Science, 2(1), 29. https://doi.org/10.26740/jses.v2n1.p29-33

Santi Septiyani, Simanjuntak, V. G., & Supriatna, E. (2005). Kemampuan tendangan mawasi geri pada ekstrakurikuler karate di smp negeri 2 sintang. Santi Septiyani, 1–21.

Saputra, T., & Purbodjati, P. (2022). Pengaruh Latihan Skipping Terhadap Kecepatan Tendangan pada Cabang Olahraga Karate SMAN 1 Sooko. Indonesian Journal of Kinanthropology (IJOK), 1(2), 82–87. https://doi.org/10.26740/ijok.v1n2.p82-87

Sari, P. S., Sugiharto, S., Sulaiman, S., & Pramono, H. (2020). Pengaruh Latihan Resistance Band terhadap Kemampuan Pukulan Gyaku Tsuki pada Karateka Forki Kota Palembang. 602–605.

Shalahudin, F., & Sifaq, A. (2023). JPO: Jurnal Prestasi Olahraga SURABAYA. JPO: Jurnal Prestasi Olahraga, 6(1), 20–24.

Syahputra Manik &, R. P. H. (2023). J2IO Jurnal Jendela Ilmu Olahraga. J2IO Jurnal Jendela Ilmu Olahraga, 2(1), 28–33.

The Effect of "Ankle Weight" And "Resistance Band" Training On Increasing Kick Speed of Nare Chagi Athletes Club Taekwondo Harapan Jaya Lampung. (2022). International Journal of Social Science and Human Research, 05(07), 3089–3093. https://doi.org/10.47191/ijsshr/v5-i7-43

Wardana, J. R. I. (2017). Pengaruh latihan permainan target terhadap ketepatan. 27–35.

Yudhistira, D., & Tomoliyus. (2020). Content validity of the agility test in the karate kumite category