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The effect of rubber training on *Kisame Tsuki*'s punch speed in Karate

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ABSTRACT

This research aims to determine: (1) the effect of rubber training on *Kisame Tsuki*'s punches; (2) increase in *Kisame Tsuki*'s punch speed. The design of this research is quantitative using a Two Group Pretest Posttest design, namely an experimental design carried out on two different groups, namely the rubber group and the control group. The population of this study were senior athletes aged 21 years and over. The sample for this study was 14 kumite athletes taken using a random sampling technique. The data analysis technique used was the Independent Sample T-test with a significance level of $\alpha = 0.05$. The research results are as follows. (1) There is an influence of rubber training on *Kisame Tsuki* Sig's punches. (2-tailed) (0.004) < 0.05 and also the calculated t value (3.613) > t table (2.447); (2) There was a significant increase in *Kisame Tsuki*'s punch speed as seen from the rubber group's gain score of 0.49, which means there was a moderate increase. So training using rubber tools has an influence in increasing the speed of *Kisame Tsuki*'s punches in UNJ Student Karate athletes.

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INTRODUCTION

Many students in sports excel outside the majors of study they are engaged in. Many universities in Indonesia provide a place to develop abilities and make these students as coaching athletes (Gumantan et al., 2021; Lumintuarso, 2020; Maksum & Indahwati, 2023; Pelana et al., 2020; Purwanto & Burhaein, 2022). Efforts to achieve achievements in sports are complex, because they involve many factors, including internal factors such as physical and mental athletes and external factors such as coaches, organizations, infrastructure, and the environment (Dehghansai et al., 2020; Lesmana et al., 2020; Moelyadi, 2020; Mulyana et al., 2022; Qi et al., 2024). Universitas Negeri Jakarta or known by the abbreviation UNJ provides a place for every student to develop their interests and talents, especially in sports. Karate is one of the platforms provided by the campus for students who have interests and talents in it. Training is carried out according to the training program that has been arranged systematically towards the target match to be achieved.

This research is a modified replication of Nursaqinah (2023) which has differences from previous studies. The difference from previous studies is that researchers reduce dumbbell variables because researchers want to see specifically and in detail related to the presence or absence of the effect of rubber training on the speed of *Kisame Tsuki* punches. Research conducted by Fukuda et al. (2010) shows that the average speed of adult Karateka punches is about 18-25 meters per second (m/s) or about 65-90 kilometers per hour (km/h) for straight punches (*Tsuki*) and about 15-20 m/s or about 54-72 km/h for roundhouse kicks (*Mawashi Geri*). Research conducted by MacMahon et al. in 2019 showed that the average speed of international karateka punches is around 21-24 m/s or around 76-86 km/h for straight punches.

One of the basic punching techniques in karate is *Kisame Tsuki*. The pattern of *Kisame Tsuki* punch movements is a fast punch straight forward with the target chest or head. Compared to other punches, *Kisame Tsuki* is more effective in gaining points because the position of the hand reach is closer to the target of the blow. Seeing the characteristics of *Kisame Tsuki* punches, to increase the ability of punch speed must be given special arm muscle exercises that lead to an increase in the ability of *Kisame Tsuki* punch speed. Karate athletes must be able to punch *Kisame Tsuki* quickly in order to earn points in the match. Federation (2011) explains:

"punctuality, rhythm, speed, balance, and strength focus (*Kime*)", in this case speed is important in the sport of karate.

The tool that can be used to increase speed in this study is rubber, but there are many assumptions that increasing speed can be done with the usual type of technique training without using tools. Meanwhile, technical training can also use the right tools to train arm strength to support the formation of maximum speed in blows (Allen et al., 2019; Bompa & Carrera, 2015; Labintsev et al., 2021; Tapajcikova et al., 2022; Tulendiyeva et al., 2021). A rubber tool, which is also known as a resistance band, is a rubber specialized and used for training with various sizes and weights (Al-Aasemi & Almusawi, 2022; Freire et al., 2022; Hasan & Hasan, 2022; Page & Ellenbecker, 2019; Sayedahmed, 2022; Tapajcikova et al., 2022). Rubber has spring power that matches the characteristics of *Kisame Tsuki* punches that require speed of push and pull.

The researcher, in this case, thought to modify previous research to see the results of rubber training specifically on the speed of *Kisame* strokes as additional information and knowledge to coaches, athletes and the public. By examining the impact of rubber training on Kisame strokes, the researcher aimed to elucidate whether this training method could enhance stroke velocity, potentially leading to improved performance in aquatic sports such as swimming or competitive diving. This investigation not only seeks to contribute valuable insights to the scientific community but also to provide practical implications for training regimens employed by athletes and coaches worldwide.

METHOD

In this study using a quantitative approach and the type of research is a two-group pretest posttest design experiment.This study was a study using two groups that received different treatments in the form of tools, namely rubber group exercises and control group exercises without tools. The design of this study can be seen in Table 1.

Table 1. Two Group Pre-Post Test Design Group

Subject	Pre	Treatment	Post-test
O1	pre-test	Rubber group	Post-test
O2	pre-test	Control Group	Post-test

This research was conducted at Jakarta State University. The research was conducted for 1.5 months from February 28 to April 4, 2024. The population of this study was members of UNJ Student Karate totaling 75 senior athletes, taken as a sample of 14 athletes by purposive sampling. The consideration taken was Karate Mahsiswa UNJ which was included in the category of active athletes totaling 14 people who were male kumite category athletes totaling 7 athletes and female 7 athletes. Researchers in this study took samples, namely kumite athletes according to the title and problems in this study. Data collection in this study used 2 groups, namely the rubber group of 7 athletes and the control group of 7 athletes.

This research is experimental. The experimental research design used the design of two groups pretest posttest involving variables, namely independent variables in the form of rubber training groups, and dependent variables in the form of *Kisame Tsuki* punch speed.

The data taken is the fastest time data using the Kisame Punch Speed test instrument that has been validated by experts in previous studies. The tools used in data retrieval consist of punching bags, whistles, stopwatches, books and ballpoint pens. Treat the test athlete standing with the kumite position 90cm away from the target, then make a *Kisame Tsuki* punch 1 time hitting the target, the tester calculates the time when the athlete starts to step forward and stops the time when the athlete's hand hits the target. The experiment was carried out 2 times and will be taken the best time.

The data analysis techniques used in this study are as follows: (1) calculation of sample normality, is a test of the normality of the data analyzed, the test used is Kolmogorov Smirnov's union; (2) homogeneity calculations, which are intended to ensure that the groups that make up the sample come from the same population; (3) the calculation of research hypothesis testing was carried out using Independent Sample T-test analysis according to data and objectives using a program, SPSS 29 computers with a significance level of 5% or 0.05.

Rubber or known as resistance band has different weight levels in this study using rubber with 2 types, namely yellow with a resistance weight of 3.5 – 7 kg and red with a resistance weight of 5kg – 16 kg. Treatment is given 16 times with a frequency of exercise 4 meetings every week. The exercise program can be seen in Table 2.

Table 2. Exercise Program

Types of Exercises
Kisame on target slow

Step kisame		
Step and pull		
Step Kisame		
Double Step Kisame		
Kisame on explosive targets		
Dose		
Item	**Micro 1-2**	**Micro 3-4**
Repetition	15	17
Set	3	4
Intensity	65%	75%
Rubber	Yellow 3,5kg - 7kg	Red 5kg - 16 kg
Rest/reps	30 seconds	30 seconds
Rest/sets	60 seconds	120 seconds

RESULTS AND DISCUSSION

Initial Test Data

Taking initial test data or pretest, rubber group subjects totaled 7 people. Pretest data collected on samples that carried out the rubber group were obtained namely the lowest time of 1.50 seconds, the highest time of 1.30 seconds, the middle value or mean of 1.40 seconds, and Std. Deviaton 0.08. Taking initial test data or pretest, the control group subjects totaled 7 people. Pretest data collected in samples that carried out the control group were obtained namely the lowest time of 1.26 seconds, the highest time of 1.68 seconds, the middle value or mean of 1.50 seconds, and Std. Deviaton 0.15.

Final Test Data

Taking final test data or posttest, rubber group subjects totaled 7 people. Pretest data collected on samples that performed rubber training were obtained namely the lowest time of 1.15 seconds, the highest time of 1.41 seconds, the middle value or mean of 1.25 seconds, and Std. Deviaton 0.09. Taking final test data or posttest, the control group subjects totaled 7 people. Pretest data collected on samples that performed dumbbell exercises were obtained namely the lowest time of 1.27 seconds, the highest time of 1.67 seconds, the middle value or mean of 1.49 seconds, and Std. Deviaton 0.15.

Table 3. Rubber Group Data Results

No	Sample	Pre Test	Post Test	Gain Score
1	S1	1,3	1,41	0,55
2	S2	1,32	1,28	0,18
3	S3	1,33	1,26	0,29
4	S4	1,43	1,31	0,17
5	S5	1,46	1,18	0,88
6	S6	1,47	1,15	0,38
7	S7	1,5	1,17	1,00
Average		1,40	1,25	0,49

Table 4. Control Group Data Results

No	Sample	Pre Test	Post Test	Gain Score
1	S1	1,26	1,27	0,04
2	S2	1,42	1,42	0,00
3	S3	1,43	1,41	0,22
4	S4	1,53	1,52	0,50
5	S5	1,57	1,55	0,40
6	S6	1,65	1,65	0,00
7	S7	1,68	1,67	0,06
Average		1,51	1,50	0,10

Normality Test

The normality test in this study was used to determine whether or not a spread is normal. The normality test in this study used the Shapiro-Wilk test because the data was less than 100. The results of the speed data of UNJ Student Karate athletes obtained $p > 0.05$. The results can be concluded that the research data are normally distributed.

Table 5. Normality Test

Group		Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	*df*	*Sig.*	*Statistic*	*df*	*Sig.*
Result	Pre Test Rubber	0,236	7	.200*	0,873	7	0,196
	Post Test Rubber	0,208	7	.200*	0,928	7	0,531
	Pre Test Control	0,137	7	.200*	0,953	7	0,758
	Post Test Check	0,142	7	.200*	0,952	7	0,746

Homogeneity Test

The homogeneity test is useful for testing sample similarity, namely uniform or not variants of samples taken from the population using SPSS version 20. The homogeneity test was carried out using the anova test obtained by the results of speed data for UNJ Student Karate athletes obtained by sig. > 0.05. The results can be concluded that the data of this study are homogeneous.

Table 6. Homogeneity Test

		Levene Statistic	df1	df2	Say.
Result	Based on Mean	1,467	1	12	0,249
	Based on Median	1,106	1	12	0,314
	Based on Median and with adjusted df	1,106	1	10,176	0,317
	Based on trimmed mean	1,39	1	12	0,261
Training Results	Based on Mean	1,467	1	12	0,249
	Based on Median	1,106	1	12	0,314
	Based on Median and with adjusted df	1,106	1	10,176	0,317
	Based on trimmed mean	1,390	1	12	0,261

Hypothesis Test

The results of the data that have been inputted show the test results of the difference between the pretest and posttest values. Test results using Independent Samples Test because samples are not interrelated Test results obtained calculated t values (3.613) > t table (2.447), Sig. (2-tailed) values (0.004) < 0.05. These results show that there is a significant influence of the rubber group on the speed of *Kisame Tsuki*'s punch. Based on these data, there was an increase in the speed of *Kisame Tsuki* punches of UNJ student karate athletes. The gain score results from both groups are as follows: (1) rubber group 0.49 which is $0.3 \leq g < 0.7$ which means it has a moderate increase; (2) the control group of 0.10 is $G \leq 0.3$ which means it has a low increase. If compared, rubber group training is more influential on increasing the speed of *Kisame Tsuki* punches in UNJ Student Karate athletes.

Tabel 7. Independent Test Sample T-test

	F	Sig.	t	df	Significance	
					One-Sided p	*Two-Sided p*
Equal variances assumed	58,497	0	3,613	12	0,002	0,004
Equal variances not assumed			3,613	6,089	0,005	0,011

Table 8. Gain Score Table

Gain Score Criteria (Arifatun et al., 2015)	
Interval	***Criteria***
$G \geq$	High
$0,3 \leq g < 0,7$	Medium
$G \leq 0,3$	Low

Discussion

The discussion of the results of this study provides further interpretation of the results of data analysis that has been put forward, based on the hypothesis that has been done. The conclusion of the analysis can be further described as follows:

The results of hypothesis testing showed that there was an effect of training on the rubber group on *Kisame Tsuki* punches, in this result there was an increase in the speed of *Kisame Tsuki* punches on UNJ Student Karate athletes. This is in line with previous research by Nursaqinah (2023) which also stated that rubber training is more effectively used to increase the speed of *Kisame Tsuki* punches. Akbar, Ilham (2022) there is an influence of resistance band training on the punching ability of junior karate athletes in Sarolangun Regency.

There are many supporting factors to increase the speed of the blow, one of which is the factor of using the right tool, namely the exercise carried out with the appropriate supporting tool, in this case, the rubber is considered in accordance with the characteristics of the *Kisame Tsuki* punch where this punch requires rapid explosiveness and traction. *Kisame Tsuki* punches can be an effective weapon in matches because the hand position is closer to the target's range. However, if the *Kisame Tsuki* punch is done with slow movements, it can be easily read by the opponent so that there will be blocking from the opponent. Therefore, training is needed to increase the speed of *Kisame Tsuki*'s punches.

This rubber or resistance band has different weights, but in this study 2 types with different weights were selected, namely yellow 3.5kg – 7kg and red 5-16kg, this is the weight when the position is resistant or pulled. This weight selection is based on the needs of the athlete's needs according to the purpose because this type of resistance level is suitable for *Kisame Tsuki* punches whose characteristics are to make fast forward punches and pull as quickly as possible. Increased load in the exercise program according to the principles of exercise. Weight starting with yellow continues to red, there are no definite reports or studies related to specific weight that can be used as a means of increasing punch speed. Previous studies have only explained the weight of rubber without any special patoka that can be used.

Training using rubber is indeed effective in increasing the speed of *Kisame Tsuki*'s punches, besides that there is likely to be an increase in other physical abilities. Research on martial sports in this case karate is still little done. However, from previous studies that there is an increase in the speed of *Kisame Tsuki* punches in karate athletes (Febryanti, 2023). The specifics of the exercise program are not described in detail, but the weight of rubber, intensity, and exercise time are almost the same as this study. So that training using this rubber tool can be adopted by coaches and athletes who want to train.

The results of this study can be used by karate coaches and athletes to improve physical abilities at the preparatory stage. If you want to give it in the competition phase, it would be better to take into account its volume and intensity. Limitations of this study are the lack of literacy on the effect of rubber or resistance bands on speed, and how to determine the weight of resitace on rubber. However, the results of this research can be used as a basis in the future, especially for karate.

CONCLUSION

The experimental research using rubber tools found that rubber training increases the speed of *Kisame Tsuki* punches in UNJ Student Karate athletes. This suggests that rubber training is suitable for improving punch speed. However, further research is needed to improve results and ensure the safety of the subjects. Further research should include more subjects in quarantine and explore variations in speed training methods to better understand the effects of rubber training on *Kisame Tsuki* punches.

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