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Do exercise for 4 weeks using rubber to increase the speed of gyaku tsuki karate punches gokasi karate athletes aged 16-20 years?

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Abstract

Effective physical training is crucial for karate athletes aiming to enhance their techniques and increase the speed of their attacks, particularly gyaku-tsuki. This study investigates the impact of rubber-based exercise on the speed of gyaku-tsuki punches among Gokasi karate athletes in Jember Regency with an age range of 16-20 years, male and female. An experimental method with a one-group pretest-posttest design was employed. The population in this study were Gokasi Jember karate athletes in junior to senior classes, with a total of 12 athletes. The sampling technique used in this research is total sampling. Therefore, the entire population was taken as a sample of 12 athletes. Speed measurements of the gyaku-tsuki punch were taken both before and after the rubber training regimen. Data analysis using SPSS 21 covering descriptive analysis, normality test, and Paired sample Test. The paired sample test yielded a significance value of 0.000, which is below the 0.05 threshold. Analysis of the pre-test and post-test averages shows an increase from 30.67 to 31.92. These findings suggest that a four-week rubber training program positively affected Gyaku-Tsuki punch speed. Furthermore, the average results demonstrate an improvement in punch speed. These findings contribute to karate coaches and athletes applying rubber exercises to improve gyaku-tsuki punch speed. The findings also provide valuable insights for karate coaches and athletes, recommending the inclusion of rubber-based training in their routines to enhance the speed and effectiveness of gyaku-tsuki punches.

Keywords: Rubber exercise, gyaku-tsuki punch speed, gokasi karate athlete.

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INTRODUCTION

Training in karate is essential for developing athletes' fundamental physical and technical skills, including speed, power, and striking accuracy. One challenge that karate athletes often encounter is identifying effective

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training methods to enhance overall performance, particularly in punching speed, such as gyaku-tsuki. Resistance and elasticity-based training, such as the use of resistance bands, is believed to enhance muscle performance by improving endurance and movement speed (Smith, Wang, & Lee, 2020). Nevertheless, more research is needed to investigate how these training methods can be effectively implemented to improve striking techniques and increase punching speed among karate athletes (Kimura & Tanaka, 2019).

Gyaku-tsuki punch speed is a crucial element in karate technique that influences the effectiveness of attacks during matches (Yulianti et al., 2024). However, many karate athletes struggle to improve this punch speed despite engaging in various forms of physical training (Sato, Yamada, & Kimura, 2020). Several factors may contribute to this low punch speed, including ineffective training methods, inadequate techniques, and a lack of emphasis on explosive strength and coordination training essential for enhancing movement speed (Wibowo & Setiawan, 2021). Gyaku-tsuki punch speed is a crucial factor that influences the success of an attack in karate. Several factors may contribute to this low punch speed, including ineffective training methods, inadequate techniques, and insufficient emphasis on explosive strength and coordination training necessary for enhancing movement speed (Wibowo & Setiawan, 2021). Additionally, a lack of variation in training and minimal use of training aids such as resistance bands or plyometric methods further hinder the development of gyaku-tsuki punch speed among karate athletes in Jember (Rahmawati, 2022).

In the context of the sport of karate, a fast and accurate striking technique, such as gyaku tsuki, it is very important to get points and beat your opponent (Márcio Fagundes Goethel et al., 2023), not only that, according to speed, this is also useful for avoiding your opponent's attacks (Osman Nur Matutu, Nurliani, & Fahrizal, 2019). This punch also really emphasizes the response or reaction speed of the hand when launching an attack on the opponent's area (Hotliber Purba, 2019). The importance of gyaku-tsuki speed and technique in karate stems from its vital function in

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10 (3) 2024 | 390-404

both offensive and defensive maneuvers. Speed is also closely tied to power, as increased velocity generates greater force upon impact (Ishikawa & Nakamura, 2020). In competitive kumite, speed plays a key role in scoring, with judges rewarding clear and rapid techniques (Wibowo & Setiawan, 2021).

Furthermore, enhancing gyaku-tsuki speed improves reaction times, allowing karate practitioners to adapt more quickly to opponents' actions and deliver more effective counter-attacks. From a defensive perspective, a fast gyaku-tsuki facilitates immediate counter-strikes after evading or blocking, making it an essential component for maintaining control in combat (Rahmawati, 2022). To increase the speed of this punch, various training methods have been developed, one of which is training using rubber.

Current speed training in karate incorporates a variety of methods designed to enhance explosive power and reaction time, essential for effective combat performance. Plyometric exercises, such as jump squats and medicine ball throws, are frequently employed to develop fast-twitch muscle fibers, which contribute to quicker strikes (Fleck & Kraemer, 2014). By increasing strength and power through resistance training with bands or weights, methods can be performed more quickly (Mcleod et al., 2024). Additionally, drills that focus on shadowboxing and quick partner reactions are utilized to improve timing and coordination (Moran, 2020). By combining these approaches, karate practitioners can significantly improve their striking speed and overall performance in competitions.

Exercises using rubber as a training tool aim to increase muscle strength (Prasetiya & Aryanti, 2024). Rubber that functions with a spring system creates traction when performing punches such as gyaku-tsuki, while also training the athlete's technique and physique (Yulianti, Setiawan, Pujianto, & Abdulaziz, 2024). This effect is caused by the stimulation of a punch from a rubber weight, which is effective in changing the anatomical condition of the muscle (Tasew & Getnet Tasew, 2020). These changes contribute to an increase in physical potential, especially in terms of hitting

https://doi.org/10.29407/js_unpgri.v10i3.23115
10 (3) 2024 | 390-404

speed (Duhe, 2012). Practicing strikes with rubber weights can increase the average punch speed in karate (Tri Wulandari & Sujarwo, 2023). Training with rubber tools has been shown to improve the punching speed of Kisame Suki (Nursaqinah, Tomoliyus, & Sukamti, 2024). Training with rubber tools enhances the punching speed of Gyaku-Tsuki and Kizami-Tsuki techniques at Sada Karate Dojo (Yulianti et al., 2024).

Observations conducted on April 28, 2024, at the Gokasi athlete training camp in Jember Regency revealed that many athletes were not executing gyaku-tsuki punches with proper technique. Issues identified included incorrect target direction and insufficient punch speed. The gyaku-tsuki punch involves using opposite hands and feet, with the target aimed at the midsection or chudan area (Putra, 2022). Based on an interview conducted on this occasion, the trainer of Dojo Manggala (Shihan Slamet Riyadi) explained that there was still a lack of variety in the exercises carried out to support the speed of the gyaku-tsuki punches and the variations that had been given previously were still monotonous and carried out without any tools. Therefore, special treatment is needed to solve the problem of the lack of gyaku-tsuki punch speed that occurs in Gokasi Jember Regency athletes. Training using rubber aids is used in treatment to increase the speed of gyaku-tsuki punches in Gokasi Athletes, Jember Regency, with an age range of 16-20 years, male and female.

Previous research has demonstrated that training with rubber tools increases the speed of gyaku-tsuki punches (Wibowo and Setiawan, 2021). Additionally, Ishikawa and Nakamura (2020) reported that plyometric exercises with rubber tools improved muscle activation and explosive strength, contributing to faster technique execution. These findings suggest that utilizing rubber tools in training can effectively augment the speed and power of gyaku-tsuki punches in karate practitioners (Ishikawa & Nakamura, 2020). The difference with previous research is in the training program. However, this type of training has not yet been implemented at the Gokasi athlete training camp in Jember Regency. The rubber training program lasted for 4 weeks, with sessions held 3 times per week, totaling

https://doi.org/10.29407/js_unpgri.v10i3.23115
10 (3) 2024 | 390-404

12 sessions (Deng et al., 2023). The novelty of this study lies in introducing rubber training at this specific camp. This study designed a training program that was different from previous studies. The rubber training program lasted for 4 weeks, with sessions held 3 times per week, totaling 12 sessions. Additionally, the findings can serve as a valuable reference for karate trainers in Jember, offering effective methods to enhance the gyaku-tsuki punching speed of their athletes. This research aims to investigate the impact of rubber training on the speed of gyaku-tsuki punches during 4 weeks.

METHOD

This research approach is quantitative, using experimental methods. The research design applied was a one-group pretest-posttest design, which involves administering a pre-test to assess initial conditions before treatment and a post-test to assess conditions after treatment (Ranjit, 2019). With this method, comparisons of conditions before and after treatment can be made more accurately (Lee, Kim, & Park, 2021). The population in this study were Gokasi Jember karate athletes in junior to senior classes, with a total of 12 athletes. The population taken was selected randomly, using the criteria of junior to senior class. The sample is part of the population and characteristics of the population. The sampling technique in this research is to use total sampling (Lee, Kim, & Park, 2021). Therefore, the entire population was taken as a sample of 12 athletes. The sample in this study were athletes who had trained for at least 1 year, male and female, aged 16-20 years.

The rubber training program lasted for 4 weeks, with sessions held 3 times per week, totaling 12 sessions (Johnson & Lee, 2021). The data collection technique is 30 second gyaku-tsuki punchess (Wąsik et al., 2019). The test carried out aims to determine and measure the speed of the gyaku-tsuki punch. Gyaku-tsuki's punching speed is defined as the ability to throw punches aimed at the solar plexus (chudan tsuki) with the correct technique, at the fastest possible speed and with the right stance (Adil et al., 2024). The results of the punches obtained are counted and recorded. Namely, the

https://doi.org/10.29407/js_unpgri.v10i3.23115
10 (3) 2024 | 390-404

gyaku-tsuki punches were carried out using the correct technique within 30 seconds. The data analysis technique used SPSS 21, namely the t-test at a significance level of 95% and alpha of 0.05.

The treatment process for this study consisted of a structured training regimen lasting four weeks, specifically aimed at enhancing the speed of gyaku-tsuki punches through the use of rubber-based tools. Training sessions were held three times a week, resulting in a total of 12 sessions. Each session commenced with a standardized warm-up to prepare the athletes physically and minimize the risk of injury. The main focus of the training involved various drills that incorporated rubber bands and other resistance tools, targeting improvements in the speed, technique, and power of the gyaku-tsuki punch. Athletes received instruction on proper form and execution to ensure that the training was both effective and safe, with ongoing feedback provided during each session to help refine their technique.

Data collection for the study utilized a pre-test and post-test design to assess the effectiveness of the training program. Prior to the intervention, baseline measurements of the athletes' gyaku-tsuki punch speed were taken using a speed radar gun, establishing a quantitative benchmark for comparison with the post-intervention results. After the four-week training period, the same speed tests were conducted under consistent conditions to ensure reliability in data collection. Additional variables, including the athletes' physical condition and prior experience, were documented to provide context for the results.

The research adhered to a systematic procedure to ensure reliability and validity. Following the acquisition of informed consent from all participants, an initial assessment was performed to measure baseline punch speed. Random assignment of participants to the treatment group helped minimize selection bias. Throughout the training period, adherence to the training regimen was closely monitored, and attendance was recorded for each session. At the conclusion of the four weeks, final punch speed measurements were taken, and the data were analyzed using

https://doi.org/10.29407/js_unpgri.v10i3.23115
10 (3) 2024 | 390-404

appropriate statistical methods, such as paired sample t-tests, to evaluate the significance of the findings. This comprehensive approach ensured that the study effectively measured the impact of rubber-based training on the speed of gyaku-tsuki punches.

RESULT

A series of field studies were conducted to investigate the impact of rubber training on the gyaku-tsuki punch speed of Gokasi karate athletes in Jember Regency, yielding comprehensive research data. Data collection involved measuring gyaku-tsuki punch speed through pre-test assessments before any training intervention and post-test assessments after the rubber training was implemented. The objective of these tests was to evaluate the extent to which rubber training influences punch speed. The first result will be presented as a descriptive analysis.

Table 1. Descriptive Statistics for Gyaku-Tsuki Punch Speed

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test of Speed of Gyaku-Tsuki Punches	12	25	38	30,67	4,228
Post-test of Speed of Gyaku-Tsuki Punches	12	26	40	31,92	4,358

According to the results obtained from SPSS, the pre-test minimum score was 25, and the post-test minimum score was 26. The maximum score on the pre-test was 38, while the post-test maximum score was 40. The mean score increased from 30,67 in the pre-test to 31,92 in the post-test. The standard deviation was 4,228 for the pre-test and 4,356 for the post-test. The overall data reflect a successful outcome of the training program or intervention implemented. A 4-week rubber training intervention to improve gyaku-tsuki punching speed.

Table 2. Normality Test for Gyaku-Tsuki Punch Speed

	Shapiro-Wilk		
	Statistic	df	Sig.
Pre-test of Speed of Gyaku-Tsuki Punches	0,938	12	0,468
Post-test of Speed of Gyaku-Tsuki Punches	0,958	12	0,748

The Shapiro-Wilk normality test using SPSS indicates that the Sig value for the pre-test is 0.468 > 0.05, and for the post-test is 0.748 > 0.05, demonstrating that the research data is normally distributed. Consequently, a Paired Sample Test can be conducted.

https://doi.org/10.29407/js_unpgri.v10i3.23115
10 (3) 2024 | 390-404

Table 3. Paired Sample Test for Gyaku-Tsuki Punch Speed

	Sig. (2-tailed)
Pre-test – Post-test Speed of Gyaku-Tsuki Punches	0,000

The paired sample test results in Table 4 show a Sig value of 0.000, which is less than 0.05. This indicates a significant effect of the four-week rubber training program.

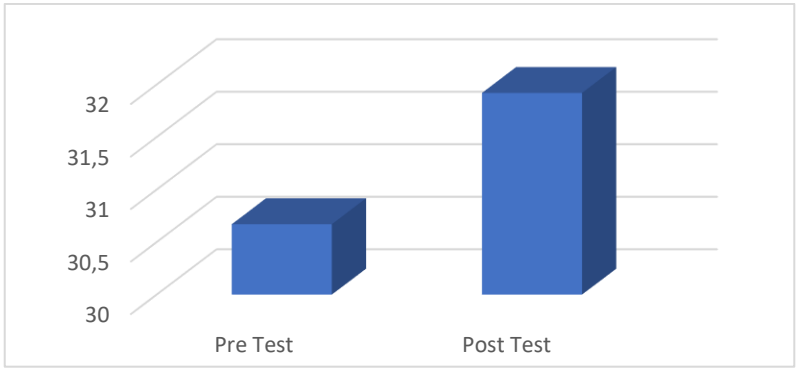

Figure 1. Increased Speed between pre-test and post-test

An analysis of the average pre-test and post-test results indicates an increase from 30,67 to 31,92. The table above shows that the post-test results for the speed of gyaku-tsuki karate punches were higher than the post-test.

DISCUSSION

The study results indicate that a four-week rubber training program had an impact on Gyaku-Tsuki punch speed. Additionally, the average results reveal an increase in Gyaku-Tsuki punch speed. These findings are consistent with earlier studies that demonstrate how training with rubber equipment can enhance the punching speed of Kisame Suki (Nursaqinah et al., 2024; Tri Wulandari & Sujarwo, 2023). This study focuses on the effectiveness of rubber-based tools in enhancing the speed of gyaku-tsuki in karate over four weeks. It employs a well-structured design with clearly defined training sessions, enabling a thorough analysis of the training's impact. A distinctive aspect of this research is its integration of physical training with biomechanical considerations. By utilizing rubber tools, the study not only targets speed improvement but also explores how these tools influence technique and strength during the execution of gyaku-tsuki.

https://doi.org/10.29407/js_unpgri.v10i3.23115
10 (3) 2024 | 390-404

Gyaku-tsuki is an important technique in the sport of karate. Gyaku Tsuki, or opposite punches with the front foot delivered through a strong and stable stance, is one of the basic techniques in karate which is often used in various competitions (Fadhila et al., 2024; Márcio Fagundes Goethel et al., 2023; Manullang, Soegiyanto, & Sulaiman, 2014). A swift gyaku-tsuki makes it challenging for opponents to block or counter, increasing the chances of landing a strike before they can respond (Smith & Lee, 2021). Precise timing and accuracy are crucial, as a quick and well-executed punch can disrupt an opponent's strategy, providing the karateka with an edge (Jones, Smith, & Brown, 2019).

Research has examined the effectiveness of rubber-based tools, such as resistance bands, in a variety of exercise regimens, including martial arts training. Findings suggest that rubber-based training can significantly improve athletic performance by enhancing strength, speed, and overall movement efficiency (Brown, Smith, & Lee, 2021). Using rubber as a tool exercise is not only effective in increasing speed but also contributes to physiological and anatomical adaptation (Yulianti et al., 2024). Rubber that works with a system spring creates pull moments do punches, which trains technical and physical athletes in a way simultaneously (Prasetiya & Aryanti, 2024). Adaptation physiological covers the enhancement of strength and elasticity of muscle (Pratiwi, Setijono, & Fuad, 2018), and temporary adaptation anatomical covers the addition of mass muscle and increased thickness of fiber muscle (Eken & Emin Kafkas, 2022; Zachary M., 2022). This impact is positive on potential physique athletes, especially in matter speed (Fajrin, Kusnanik, & Wijono, 2018; Gökkurt & Kıvrak, 2021; Mondal & Mitra, 2019).

A 4-week plyometric training regimen can effectively enhance speed (Guimarães et al., 2023; Susantia et al., 2021). This research is in line with the results of this study, which showed that speed increased after training for 4 weeks. This study applied 4 weeks using rubber to increase the speed of gyaku-tsuki karate punches gokasi karate athletes.

Through utilization style tug-of- war by rubber, contracting muscles can encouraged. According to opinion (Same, 2021). Using weighted rubber for punching exercises significantly boosts the average punch speed in karate. This enhancement occurs because the added resistance from the rubber stimulates both physiological and anatomical changes in the muscles.

In the context of sport karate, enhancing the speed of gyaku-tsuki punches is crucial for scoring points and excelling in matches (Adil et al., 2024). Integrating rubber-based exercises into karate training programs can enhance performance and effectiveness in competition. These findings contribute significantly to the development of training methods in karate and open opportunities for further research on the application of elastic resistance in other sports. The limitations of this study include evaluating the long-term effects of using rubber-based equipment on the speed of gyaku-tsuki. Additionally, the small sample size may hinder the generalizability of the findings, as the diversity in experience and skill levels among Gokasi karate athletes in Jember Regency might not be adequately represented. External factors such as the athletes' initial physical condition, diet, and psychological aspects were also not considered, potentially impacting the results. Lastly, while the measurement methods employed were deemed appropriate, the potential for errors in speed measurement could compromise the accuracy of the data. Future research with a more comprehensive design and advanced tools is necessary to overcome these limitations.

CONCLUSION

This study finds that utilizing rubber-based exercise significantly enhances the speed of gyaku-tsuki punches among Gokasi karate practitioners in Jember Regency. It supports the idea that rubber exercise is a valuable approach for boosting karate performance. The results also offer guidance for karate coaches and athletes to incorporate rubber training into their routines to improve the speed and efficiency of gyaku-tsuki punches. This study presents several significant implications for the

advancement of karate training, particularly for Gokasi athletes in Jember Regency. First, the findings indicating an increase in gyaku-tsuki speed through the use of rubber-based equipment may inspire coaches and athletes to embrace more effective and innovative training methods. This equipment not only enhances speed performance but can also improve technique and punching power. Second, the study provides a foundation for developing more structured and results-oriented training programs, assisting athletes in reaching their full potential. By taking into account factors such as training duration and equipment specifications, coaches can create more effective and efficient training sessions. Third, the results contribute to the existing body of literature on training methods in martial arts, paving the way for future research that explores long-term effects and other influencing variables. Therefore, this study is valuable not only for athletes and coaches in Jember but also for the broader karate community.

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