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The Effect of Training Using Rubber Media and Leg Dumbbells to Improve Uchi-Mata Ability in Judo Athletes

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Abstract. This study aims to determine the effect of training using rubber and leg dumbbells on improving uchi-mata technique skills in beginner judo athletes. The research method used is a quantitative method with a one-group pretest–posttest design. The population and sample of the study were 10 judo athletes at the Al-Jabbar Dojo, Tuban Regency, selected using a saturated sampling technique. The research instrument used a 1-minute uchi-mata throwing technique ability test before and after treatment. The training program was given for 16 meetings with a frequency of 4 training sessions per week using rubber and leg dumbbells as training aids. Data analysis used the Shapiro-Wilk normality test and paired sample t-test with the help of SPSS version 23 software. The results showed an increase in uchi-mata technique skills after being given training treatment. The average score of athletes' abilities increased from 24 in the pretest to 36 in the posttest. The results of the hypothesis test showed a significance value of 0.000 (<0.05), which means there is a significant effect of training using rubber and leg dumbbells on improving uchi-mata technique skills. Based on the research results, it can be concluded that training using rubber and leg dumbbells is effective in improving leg muscle strength, balance, and motor coordination, which supports the uchi-mata technique in beginner judo athletes. This training method can be recommended as an alternative for coaches to improve the throwing technique of beginner athletes.

Keywords: Rubber Media; Leg Dumbbells; Uchi-Mata Ability; Judo Athletes

INTRODUCTION

Exercise is an important activity for physical, mental and emotional health (Aliriad, Fahrudi, Apriyanto, & Da'i, 2023). Sport is a planned and systematic activity to develop physical and mental potential, both individually and in groups, with various goals according to type and intensity (Kusuma & Sudarsono, 2022) Exercise has been shown to improve fitness and reduce the risk of chronic disease (Cahyani, Wardana, Widianti, & Muliani, 2024). Regular physical activity helps maintain heart health, control weight, and improve sleep quality, thus becoming the center of body fitness (Da'i, Ramadhan, & Rohman, 2023). Sport aims to maintain physical and mental health, increase endurance, and support the healing of diseases (Ramadhan, Afifatul, & Priadana, 2023). Sport can become a profession along with the development of industry and various national and international event (Sihabudin, Fauji, & Ramadan, 2023). Systematic coaching and training are needed to achieve success, taking into account the physical and psychological needs of athletes (Hlasho*, Mathunjwa, Shaw, & Shaw, 2025).

Sports can be categorized into health, recreational and performance sports (Lengmani & Galeko, 2025). Sports achievements are not only a source of individual pride, but also reflect the dignity of the nation (Daulay & Priono, 2023). Each sport has a strategic role in building the nation's image through athlete development and improving the quality of training (Aliriad, Kusuma, Arbanisa, & Winoto, 2024).Athletes must have discipline, motivation, and physical and mental readiness, while training institutions are required to provide support through appropriate training facilities and methods (Aliriad et al., 2024). Improved performance is also influenced by research and innovation in training, nutrition, and sports psychology (Maghfiroh, Swadesi, & Sudarmada, 2023).

Judo is a competitive sport that has great potential, developing as a modern martial art from Japan and becoming a competitive sport in various countries (Ningrum Utari Widya, Hariono, Sudarko, & Nurdin, 2024). Judo emphasizes locking techniques, throws, and body balance with a combination of technique, strength, and speed (Achmadi, Cahyono, & Husniah, 2024). Judo also instills moral values such as respect, courage, and self-control (Ciaccioni et al., 2024). The development of judo in Indonesia is supported by many dojos that train athletes from an early age, with

early technique development being the key to competing at a high level (Utami, M.Or, & kristi, 2024).

The sport of judo has various important throwing techniques such as osoto gari, ippon seoi nage, tai otoshi, and uchi-mata, which are chosen for their effectiveness in both competition and randori (Segedi, Družeta, Dukarić, Rupčić, & Sertić, 2025). One of the superior techniques in judo is uchi-mata, where success requires balance, coordination, and muscle flexibility (Ojeda-Aravena, Moronta, Calvo-Rico, Azócar-Gallardo, & García-García, 2025). Physical exercises that emphasize leg strength, arm muscles, and flexibility are essential for the Uchi-mata technique (Pasaribu, 2021). Leg strength provides propulsion, arm muscles help control, and flexibility increases efficiency of movement (Alfarij, 2025). Maximizing the success of the uchi-mata technique requires precise timing, body positioning, and a comprehensive training program using equipment such as elastic bands and leg dumbbells (Aliriad, Priadana, & Kurniawan, 2023).

Rubber bands and leg dumbbells are considered to provide additional stimulation to enhance uchi-mata technique performance. Elastic bands are useful for training the strength and explosive power of the leg and hip muscles, which are involved in lifting and throwing an opponent (Agustiardi, Atradinal, & Bahtra, 2019). Leg dumbbells effectively increase the strength of lower body muscles, such as quadriceps, hamstrings, and calves, which are important for balance and body propulsion when performing uchi-mata (Melaty & Hardinoto, 2023). The use of this aid also trains the athlete's stability, motion control, and proprioceptive awareness (Mubarok, Ramadhan, & Putri, 2026). The combination of technical training with additional resistance makes training conditions more challenging so that athletes are better prepared to face the pressure of competition and the intensity can be adjusted to each athlete's abilities (Sue, Natal, & Samri, 2021).

A gap in previous research concerns the use of specific training tools to improve the Uchi-Mata throwing technique. Most studies have focused on analyzing the biomechanics of the movement or differences in athlete skill levels, without integrating the use of training aids that directly simulate the technique's movements. Recent biomechanical research has shown that the success of the Uchi-Mata technique is significantly influenced by body rotation speed, hip coordination, and

control of the body's center of mass displacement during the kuzushi, tsukuri, and kake phases (Hamaguchi, Liu, Shiokawa, & Deguchi, 2025). Athletes with higher skill levels demonstrate better movement speed and body control than athletes with lower skills (Brito et al., 2025). The research has not extensively examined the use of resistive training media that can help improve specific strength and motor coordination that supports the implementation of the Uchi-Mata technique. This study focuses on examining more specifically the effect of two simple training media, namely resistance bands and leg dumbbells, on improving Uchi-Mata technique skills in beginner-level judo athletes. This approach emphasizes the use of a combination of resistive training media that are easily accessible, applicable, and relevant in the context of technical development for beginner athletes.

The urgency of this research lies in the need for beginner-level judo coaches to find an effective, efficient training model that is suited to the characteristics of beginner athletes with limited training facilities. The uchi-mata technique is one of the most important basic judo techniques, requiring strength, balance, and coordination. Therefore, an appropriate training method is needed to optimize mastery from an early age (Pardomuan, Sobarna, & Sobar, 2024). This research is expected to provide practical and scientific contributions in the form of recommendations for evidence-based training methods that coaches can use to develop more specific, targeted, and athlete-needs- based training programs. More broadly, this research can serve as a reference for developing a more structured, progressive, and sustainable judo performance coaching system in the region.

The novelty of this research is that the uchi-mata technique is rarely practiced, so this technique needs to be given to beginner-level athletes, considering the uchi-mata technique is very important in competitions at various levels, so this technique needs to be introduced to beginner-level athletes. Uchi-mata is a dominant throwing technique in modern judo that has a high level of effectiveness in competitions at various levels (Ojeda-Aravena et al., 2025). In addition, mastering uchi-mata from the basic stage plays an important role in building a strong foundation of nage-waza techniques and supporting the development of the athlete's tactical abilities (Lampe, Kajmović, Lascau, Šerbec, & Meško, 2024).

Initial observations at the Al-Jabbar Dojo in Tuban Regency found that many judo athletes still experience difficulties in uchi-mata techniques, especially in aspects of balance, leg thrust, leg muscle strength, and grip. Uchi-mata movements tend to be less powerful and less accurate because existing training has not specifically targeted leg strength and dynamic balance. The purpose of this study is to examine the importance of a special training that focuses on techniques that are not widely used and the findings indicate the need for more focused training methods, such as the use of rubber media and leg dumbbells, so the researcher proposed the research title: The effect of training using rubber media and leg dumbbells to improve uchi-mata abilities in Judo athletes.

METHOD

The study used a quantitative pre-experimental method with a one-group pretest–posttest design. This design was chosen because it was able to determine the athletes' ability to perform the uchi-mata technique before and after being given treatment in the form of applying rubber media and leg dumbbells as training aids. This method is in accordance with the research model for developing uchi-mata technique training media that has been widely developed previously, such as hardware-based media (Ingeniería & Construcción, 2023), 3D-based media (Performance & Sports, 2023), which both aim to improve uchi-mata technique skills in terms of visualization and structured training stimuli.

The instrument in the implementation of the research uses a slam test (uchi- mata) which has been tested for feasibility so that the instrument is suitable for use, the success of the research is measured by the increase in the value of the uchi-mata slam technique ability before and after media treatment. The test was carried out with the facilities and infrastructure of the stopwatch test, mat, whistle, stationery. The procedure for implementing the test is that athletes are divided into two as tori (slammer) and uke (thrown). Then tori does a slam for 1 minute to uke. The technique that is counted is when it is done correctly in terms of power, speed, accuracy, and balance. Athletes who can do slams are categorized as less (1-10 times), Sufficient (11-20 times), Good (21-30 times), Very Good (31-40).

This research was conducted from October to November 2025 at the Al-Jabbar Dojo, Tuban Regency, for 16 meetings including initial and final tests with a frequency

of 4 training sessions per week, according to Tjaliek Sugiardo. The population in this study were all judo athletes at the Al-Jabbar Dojo, Tuban Regency, totaling 10 athletes. The sampling technique used was all athletes or saturated sampling, so that the entire population was used as a research sample with a total of 10 athletes who were willing to participate in the training program. This research was in the form of training using rubber media and leg dumbbells which aimed to improve the ability of the Uchi-Mata technique.

In the initial stage of the pretest, athletes were given instructions to carry out a slam test (Uchi-mata) within 1 minute for each attempt, athletes carried out slams continuously for 1 minute by counting the number of slams carried out, and after the initial test, athletes were given instructions regarding the provision of treatment to athletes up to 14 meetings with a duration of 90 minutes in one meeting. At the beginning of the treatment, it focused on introducing the training model using rubber media and leg dumbbells with low intensity, in the next meeting the treatment increased the intensity of the training to medium. The posttest was carried out at the end of the meeting, carried out like the initial meeting, namely the pretest to measure the uchi-mata slam.

The data analysis technique used was descriptive statistics to obtain the average, percentage, and distribution of athlete ability scores using (1) the Paired t-test to determine the difference in the average ability of the athlete's Uchi-Mata technique before and after treatment. (2) data normality test using the Shapiro-Wilk Test to determine whether the data on the Uchi-Mata technique ability before and after treatment was normally distributed. The entire data analysis process was carried out using SPSS version 23 software. This data analysis technique is in accordance with the research (Teisya dwi duhita hayuningtyas, 2017).

RESULT AND DISCUSSION

Research data was obtained through pre- and post-training tests to assess athletes' performance. The results showed that training with rubber and leg dumbbells positively improved uchi-mata performance. These improvements were evident in leg muscle strength, balance, and motor coordination, which supported the effectiveness of technique execution. Based on the data analysis, it can be concluded that the use of rubber and leg

dumbbells effectively improved uchi-mata performance and can therefore be used as an alternative training option in judo athlete development programs.

Results

This study included a pretest (initial test) of the uchi-mata technique ability of athletes from the Al-Jabbar Judo Dojo, Tuban Regency. The sample was then given training using rubber and leg dumbbells to improve uchi-mata ability over 14 sessions. The pretest and posttest results are shown in the following table.

Table 1. Description Data

V	N	Mean		Sd		Min		Max	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Uchi-mata	10	24	36	2,170	2,282	20	33	27	40

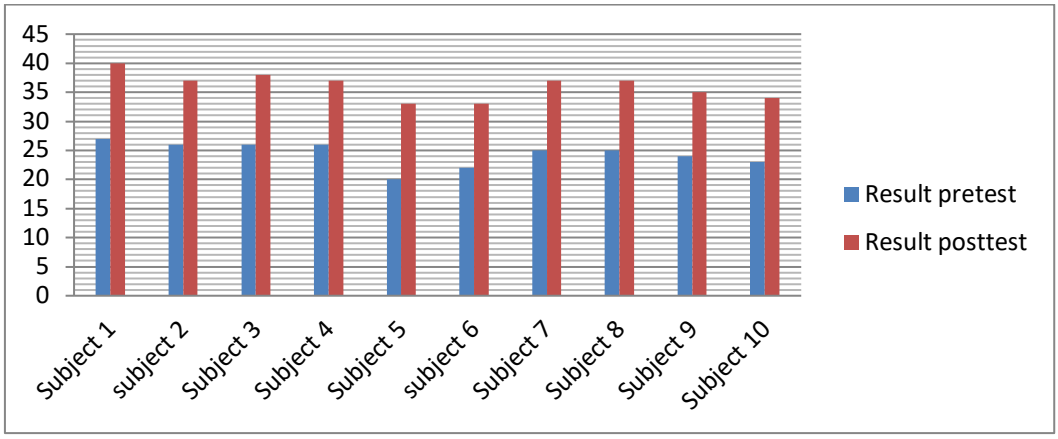
Based on the calculations in the table above, it can be concluded that the pretest and posttest data showed an improvement in the Uchi-mata technique, as seen from the mean pretest and posttest scores in the table above. Next, a data normality test was conducted to determine whether the data were normal or not.

Table 2. Pretest-Posttest Frequency

Interval	**Midpoint**	**Absolute frequency**		**Relative frequency**	
		Pre	**post**	**pre**	**post**
1 - 10	5.5	0	0	0%	0%
11 - 20	15.5	1	0	10%	0%
21 - 30	25.5	9	0	90%	0%
31 - 40	35.5	0	10	0%	100%
Total		10	10	100%	100%

The data in the table shows the frequency distribution of pretest and posttest scores grouped into several class intervals. In the 1–10 interval, the midpoint is 5.5, there were no respondents in either the pretest or posttest, so the relative frequency is 0%. In the 11–20 interval, the midpoint is 15.5, there was 1 respondent (10%) in the pretest, while there were no respondents in the posttest (0%). Furthermore, in the 21–30 interval, the midpoint is 25.5, most of the respondents in the pretest stage were in this interval, namely 9 respondents (90%), while in the posttest there were no respondents in this interval (0%). In contrast to the pretest results, all respondents in the posttest were in the 31–40 interval with a midpoint of 35.5, namely 10 respondents (100%), while in the pretest there were no respondents in this interval (0%). Overall, the number of

respondents in the pretest and posttest was 10 people each (100%). This distribution shows a shift in values from lower intervals in the pretest to higher intervals in the posttest, which indicates an increase in results after the treatment was given.



Fugure 1. Pretest-Posttest Graph

Figure 1, presented in the Pretest–Posttest Graph, shows an increase in scores across the entire population after the treatment was administered. In the pretest stage, the scores for each population were in the good range, with only one sample having the lowest score, Serli, and the highest, Pambudi. After the posttest, the entire population showed a significant increase in scores, with most reaching the excellent category. Pambudi achieved the highest posttest score, while Nita and Serli had relatively lower posttest scores than the other athletes, but showed a clear improvement compared to their pretest scores. Overall, this graph indicates that the treatment provided was effective in improving the learning outcomes and performance of all athletes studied.

Table 4. Paired T-test

Paired Differences							
			95% Confidence Interval Of The Difference				
Mean	*Std Dev*	*St.error Mean*	*Lower*	*Upper*	*t*	*df*	*Sid (2 Tailed)*
-1,170	*,8232*	*,2603*	*-12,889*	*-11,111*	*-44,941*	*9*	*0,000*

Based on the results of the paired sample t-test, the average difference value (mean difference) was obtained at -1.170 with a standard deviation of 0.8232 and a standard error of 0.2603. The 95% confidence interval for this difference is in the range of -12.889 to -11.111. The test results show a t value = -44.941 with df = 9 and a significance value (Sig. 2-tailed) = 0.000, which means the significance value is less than 0.05. Thus, it can be concluded that there is a significant difference between the two data being compared.

Table 5. Shapiro Wilk Normality Test

Normality Test	Pretest	Posttest	Information	
			Pretest	Posttest
Significant Level	.299	.314	Normal	Normal

The Shap-Piro-Wilk test was used to test the table above, as the population was <100. The distribution of the data above was >0.05 in both the pretest and posttest, thus indicating normality. It can be concluded that the data above showed a significant increase in the pretest and posttest results using the Uchi-Mata technique, as evidenced by the significance value >0.05

Discussion

Role-playing training is crucial in an athlete's life. Through planned, routine, and disciplined training, athletes can develop physical abilities, hone their technical skills, and strengthen their mental resilience (Wicaksono et al., 2020). Training sessions often require a high level of energy, patience, and focus because they often face fatigue, pressure, and various challenges (Coaching & Sports, 2023). From this difficult process grows the attitude of never giving up, perseverance, and fighting spirit that forms the character of a true athlete (Aliriad, Adi, Da, Apriyanto, & Cahyani, n.d.). The sweat, time, and sacrifices expended during training become valuable assets that are crucial in achieving the best results and future victories.

Training using rubber and leg dumbbells is a type of training that is widely used in martial arts, including judo, to improve mastery of specific technical skills. In the context of the uchi-mata throwing technique, technical training using rubber and leg dumbbells is designed to help athletes master the stages of movement of the judo throwing technique, namely: Te-Waza (throwing or slamming technique with the hand/arm), Koshi-Waza (throwing or slamming technique with the hip), Ashi-Waza (throwing or slamming technique with the foot/thigh), Sutemi-Waza (throwing or slamming technique by falling), Yoko-Sutemi-Waza (throwing or slamming technique by falling to the side) (Roni & Ihsan, 2018). Repeated and structured training allows athletes to develop automaticity of movement, coordination, and technical efficiency so that the execution of uchi-mata becomes more effective in competition situations (Franchini et al., 2022).

The use of training media such as rubber (resistance bands) and leg dumbbells in this study represents an innovative training method aimed at improving physical quality and technical accuracy. Training with rubber provides an elastic response that serves to increase specific muscle strength, motor control, and body stability during pulls and turns in the uchi-mata technique (Destya et al., 2020). The use of leg dumbbells contributes to increased leg muscle strength, explosive power, and dynamic balance, which are essential in the execution of judo throws (Suchomel, Nimphius, & Stone, 2016).

Previous research has shown that judo technique training, specifically the uchi-mata technique, combined with effective resistance training can improve self-defense skills. Specific training with additional weights can improve judo technique performance through optimal neuromuscular adaptation (Chang, Chen, Wu, Ho, & Chiang, 2022). Other research states that resistance training integrated into uchi-mata technique training can increase the functional strength and precision of judo athletes' movements, especially in throwing techniques (Kurniawan, Ambarwati, & Setiawati, 2022). The use of modified training media has also been shown to increase athletes' confidence in performing techniques (Widya, Eko, & Kurniawa, 2023). With the added weight of the rubber bands and leg dumbbells, athletes become accustomed to facing higher physical demands during training, so that when the weights are removed, uchi-mata movements can be performed more easily, quickly, and stably. Research findings indicate that training with controlled overload can increase confidence and technical consistency in judo athletes (Boguszewski, Szczygieł, Olszewska, & Boguszewska, 2025).

Hypothesis testing showed that training using rubber and leg dumbbells significantly improved the uchi-mata technique in athletes from the Al-Jabbar Judo Dojo, Tuban Regency. These findings indicate that the use of resistance-based training can optimally improve the effectiveness and quality of the uchi-mata throw technique (Kusnadi, 2020). It was concluded that training using rubber media and leg dumbbells combined with judo technique training had a positive influence on improving uchi-mata technique abilities. This training model not only focuses on movement techniques, but also on developing specific strength, balance, coordination, and adaptation to athletes' habits using uchi-mata techniques. In this study, judo technique training with rubber

media and leg dumbbells was an effort to improve uchi-mata abilities in Al-Jabbar Judo Dojo athletes in Tuban Regency. The findings in the field showed that this training approach was effective in improving the quality of uchi-mata techniques, both in terms of movement accuracy, throwing power, and athlete confidence during training and competition.

CONCLUSION

Judo technique training using rubber and leg dumbbells can improve judo technique skills, especially the uchi-mata technique. This training has a significant impact on an athlete's ability to perform the uchi-mata technique. Uchi-mata technique training using rubber and dumbbells needs to be given because the uchi-mata technique is rarely trained, so this technique needs to be given to beginner level athletes considering the uchi-mata technique is very important in competitions at various levels, so the technique needs to be introduced to beginner level athletes. The calculations above can be evidence or that the use of rubber and leg dumbbells has a significant effect. Suggestions that researchers can convey are the need for special actions or special forms of training in the form of modifications to training equipment, many studies or coaches focus on technique and physical strength without considering a training medium so that the athlete's abilities are still lacking. Recommendations for training using rubber and leg dumbbells are highly recommended in a training method, but many media can be applied in training, for example used car tires, ropes and others so that the improvement of athlete quality can be comprehensive at the beginner level.

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