

## The Effect of Sprint and Speed Ladder Modification Training on the Kick Speed of Mawashi Geri Women's Kempo Professional Athletes



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**ABSTRACT:** Speed in mawashi geri kicks is a very important element in supporting an achievement in professional athletes. This requires various superior conceptuals in order to optimize mawashi geri kicks in terms of speed, one of which is providing the right training program such as modifying the spint and speed ladder. The purpose of this study was to determine the difference in the effect of sprint modification training and speed ladder training on increasing mawashi geri kicks in Kempo female athletes in Bandar Lampung City. The method used is pseudo-experiment, with pre-test and post-test designs. The sample was used by 30 athletes who were divided into two experimental groups with a division technique using ordinal pairing. The instrument used is the mawashi geri kick test. The results showed that. (1) There is a significant influence on the modification of the sprint technique on the speed of mawashi geri kicks with the results of data  $t_{count} = 4.08 > t_{table} = 2.042$  with  $\alpha = 0.05$ . (2) There is a significant influence on speed ladder training on mawashi geri kick speed with data results  $t_{count} = 8.69 > t_{table} = 2.042$  with  $\alpha = 0.05$ . (3) Speed ladder training has a significant effect on the speed of mawashi geri kicks with the results of data  $t_{count} = 2.16 > t_{table} = 2.048$ . Thus, it can be concluded that in the final test there was a significant difference in the effect of mawashi geri kick speed between the sprint and speed ladder modification groups. So that speed ladder training is significantly more influential when viewed from the average increase in the final test of the two groups, and the implications of this study can educate trainers that these two training models can have a positive impact on mawashi geri kicks.

**KEYWORDS:** Sprint, Speed Ladder, Kick, Mawashi Geri, Athlete.

### I. INTRODUCTION

Shorinji kempo is a martial art that does not hurt people or opponents themselves, the hand and foot techniques used only cause pain when locking occurs, but when released, the pain will be released along with the lockdown (Nikmah & Suratman, 2019). Shorinji kempo is a fast-reaction martial art that learns and trains techniques, tactics, and movement strategies, hands, feet, head and other limbs practically and effectively in the pattern and form of offensive defense training, with the ability of muscles, brain and conscience in order to master a science of self-defense (Rajidin, 2018). Based on the statement above, shorinji kempo is a sport that requires focus, mind, and concentration and unites the body so that it can harmonize race, heart and mind. There are several basic techniques that must be mastered in kempo martial arts, including one of them is the mawashi geri kick.

Mawashi geri kick is a very important technique, which must be mastered by a kempo athlete because this kick technique can be used to attack opponents or to cut opponents' attacks (Simbolon & Siahaan, 2020). In addition, mawashi geri is also often used to chase points (Cahyati Anggraeni et al., 2019) and even turn the situation around if an athlete gets points behind (Oktasari, Sitepu, & Nurseto, 2018). Mawashi geri's kick technique requires foot agility so that the kick attack is able to hit the target quickly and precisely (Agus, 2018) and quickly return the foot to its original position (Saputri et al., 2022). In addition, the speed of placing the legs into their original position allows the altet to avoid the opponent's counterattack or carry out further attacks (Abriyanti & Wisnu, 2020).

Based on the achievements of Bandar Lampung city kempo athletes, the waydadi dojo in 2017 won achievements in provincial sports pecan tournaments and won 15 gold medals. Bandar Lampung kempo athletes also managed to become the overall champion at the Provincial event. In 2019, Bandar Lampung city kempo athletes participated in the pre-qualification of the National Sports Week, successfully bringing bronze medals in the women's team embu category and the Bandar Lampung

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city kempo men's team team and qualified for the National Sports Week, National Sports Week. In 2021, Bandar Lampung female kempo athletes failed to bring medals due to the obstacles experienced by the Bandar Lampung women's kempo sport were speed on mawashi geri kicks, weak kicks so that they were easily read by opponents and it was difficult to win medals at the national sports week National Sports Week.

In addition, the mawashi geri kick technique is a basic kick technique that is often used, because the kick technique is the fastest and most effective for carrying out attacks during matches (Nugroho, 2019). But most athletes when doing mawashi geri kicks look slow and less fast, this causes athletes' kicks to be easily caught by opponents and avoided by opponents when competing (Darojat, 2019). And also most athletes when doing mawashi geri kicks, the kicks are not right on the intended target, which causes during the match the kicks made by athletes do not get points (Ayubi et al., 2022). And when doing mawashi geri kicks are not fast, which causes the kick to be easily avoided by the opponent. Then when doing a mawashi geri kick, the result of the kick looks slow, so the kick is easily counterattacked by the opponent. This is due to the lack of speed training given by the coach to produce speed against mawashi geri kicks. So based on these problems, it is certainly a big task for a coach to be able to increase the speed of mawashi geri kicks, one of which is to use sprint and speed ladder exercises.

Sprint modification training is a form of modification exercise that combines elements of sprint speed and technique in kicks (Irham, 2021). This exercise is designed to train and improve the quality of work of leg muscles and other muscles that affect in performing kicks in kempo (Gultom et al., 2023), especially mawashi geri kicks. According to (Alhinduan et al., 2018) explained that sprint modification exercises require rhythmic contractions of large muscle groups of the limbs to move the entire body weight at the time of performing the sprint. After that the muscle must contract again by kicking (Juliyanto, 2016). Kicks must be done quickly, agile and determined by anaerobic capacity (Cakrawijaya, 2021). Repetitive motion cycles that take place constantly at high speeds will cause a pattern of automation of central neural processes (Arifin, 2019). Exercises to improve kicking ability are principled that the muscle must contract repeatedly quickly (Abdurrochim, 2018). Muscle coordination will have an influence on increasing the speed of special movements and will contribute well to movement skills, if athletes can improve the efficiency of motion mechanics (Fantri & Kibadra, 2019). Therefore sprint modification exercises and techniques can be used to improve the speed ability of mawashi geri kicks.

Sprint modification training is carried out in the kempo training arena, or in a place that has a flat structure and the size of the area resembles a kempo rink field. In this modified exercise, kempo athletes are required to bring out their maximum abilities in the training process, considering that this exercise is to improve the ability of mawashi geri kicks. Sprints are done with maximum power, as well as kicks are done quickly. This is in line with the research researched by (Arifin, 2019) in his research which examined the effect of sprint training, so that the results found that there was a significant influence on sprint training on the explosive power of the leg muscles of the Football School athletes.

According to (Bagia, 2016) suggests that to be able to increase speed, agility and coordination, one of them can be by using the Speed Ladder tool. Speed Ladder is a form of physical exercise whose function is to train foot speed, foot agility and synchronize motion in a balanced manner (Oktasari, Sitepu, Nurseto, et al., 2018). Speed Ladder can also increase kick speed (Fahmi et al., 2020). Speed Ladder is a form of jumping training equipment using one or two legs by jumping over a ladder-shaped rope placed on the floor or ground. Speed Ladder training is also included in direct speed, which is a training method for technique, coordination, and step frequency (Hadjarati et al., 2022).

According to (Herlina & Burhan, 2022) the programming presented should be measured at the total training volume for all core, balance, reactive, and resistance components in an exercise. The success of strenght, agility, and quickness programs also depends on the core, balance, and reactive ability of the athlete (Bili & Bete, 2021). The higher this ability, the better and safer the results the athlete will enjoy from his program (Juniar et al., 2023). All exercises must be performed with proper technique and kinetic chain control, to minimize the risk of injury (Aprianti & Ilham, 2022). Speed Ladder is a form of physical exercise equipment that resembles a ladder child placed on a flat plane or floor. This is in line with research researched by (Irham, 2021) in his research which examines the effect of speed ladder training on speed in Tuban soccer players. So that in the study it can be concluded that there is also a significant influence on the exercise on speed. Therefore, researchers hypothesize that the application of sprint and speed ladder training can improve mawashi geri kicks in female professional athletes in Bandar Lampung city.

Mawashi geri kick speed is a biomotor component that greatly influences the performance of kempo athletes in matches (Aprianti & Ilham, 2022). Speed is also the potential of the body that is used as capital or very supportive in carrying out movements (Kusmirantini & Imanudin, 2019). In pencak silat matches, speed can be seen in carrying out attacks, both kicks when getting attacks from opponents such as dodging or countering opponents' attacks (Manullang, 2017). Mawashi Geri's kick is the dominant attack in kempo matches. With that kick speed is needed in kempo matches to gain value.

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In kempo matches, kick speed can be realized when athletes make attacks and counter attacks from opponents. Speed in carrying out attacks or countering attacks from opponents such as kicks must be done to get points, because in the National Deliberation it is stated that for attacks used to obtain value, one of them is steady and powerful (Purba, 2017). With that, the kick must be fast so as not to be caught and dropped by the opponent (Baramuli et al., 2020). Based on some of the opinions above, it can be concluded that kempo athletes must have good kick speed quality so that every kick made is not easily caught by the opponent and then dropped.

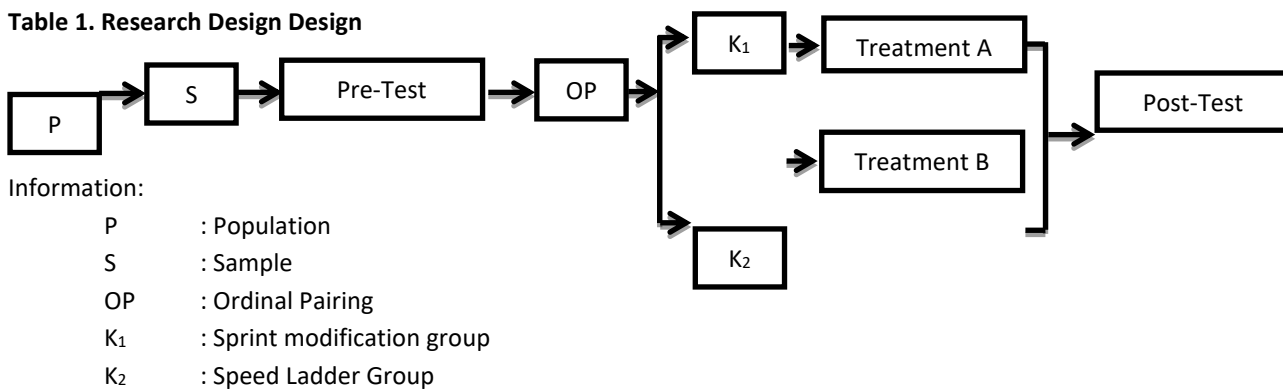
## II. METHOD

The type of research method used in this study is experimental research, with quantitative data where the experimental research method is a series of experimental activities with the aim of investigating something or problem so that results are obtained (Purba, 2017). Therefore, in the experimental method there must be factors that are tested, in this case the factors tested are sprint modification exercises and speed ladder exercises to know the effect on the speed of mawashi geri kicks.

In this research process was carried out at Dojo Way Dadi Kempo Bandar Lampung City, where this study found a total population of 30 athletes and researchers took samples of 30 athletes on the basis of sampling using the Total Sampling method. In this case, the factors tested were sprint modification exercises and speed ladder exercises to determine the effect on the speed of mawashi geri kicks in kempo female athletes in Bandar Lampung City using instruments in the form of tools called pacing pads and stop watches.

The research design used in this study was pre-test-post test design. This design has a pretest before treatment and posttest after treatment so that the results of treatment can be known more accurately, because it can compare the results before treatment. The research design can be described as follows.

**Table 1. Research Design Design**



The instrument in the mawashi geri kick test has been researched by (Simbolon & Siahaan, 2020) which shows that the  $t_{count}$  value  $> t_{table}$  ( $8.86 > 2.31$ ) and is declared valid. Then for reliability, namely using the pearson correlation of moment products with values  $r_{xy} = 0.94 > 0.7$  and declared reliable. Thus the instruments in this study have been valid and reliable. Data obtained from the results of research in the field are analyzed using quantitative analysis and sampling techniques are generally carried out randomly, data collection using research instruments, quantitative or statistical data analysis with the aim of testing hypotheses that have been set, and analyzing the data using normality tests, homogeneity tests, and hypothesis tests that will be designed using SPSS version 25.

## III. RESULT

Based on descriptive statistical tests of data types consisting of sum, mean, standard deviation and variance in each experimental group and control group. This type of data is used to analyze the difference t test Based on the results of the study, the description of the data can be described as in the following table.

**Table 2. Description of Research Results Data**

Information	Engineering Sprint Modification Group		Speed Ladder Group	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Average	17,33	17,87	16,93	20,07

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Standard Deviation	3,68	3,40	3,59	2,37
Min.	12	13	11	17
Max.	25	25	25	25

Based on the data above, a group of technical sprint modifications was obtained with an average value of 17.33 and obtained values at a standard deviation of 3.68, as well as a minimum value of 12, and a maximum of 25. With this technique sprint modification group, improved on the final test with an average score of 17.87 and obtained a score at a standard deviation of 3.40, as well as a minimum value of 13, and a maximum of 25.

While the initial test data of the speed ladder group with an average value of 16.93 and obtained a value at a standard deviation of 3.68, as well as a minimum value of 11, and a maximum of 25. With this, the speed ladder group improved in the final test with an average value of 20.07 and obtained a value at a standard deviation of 2.37, as well as a minimum value of 17, and a maximum of 25. Comparison of initial tests and final tests in the engineering sprint modification group and speed ladder illustrated with the bar chart below as follows.

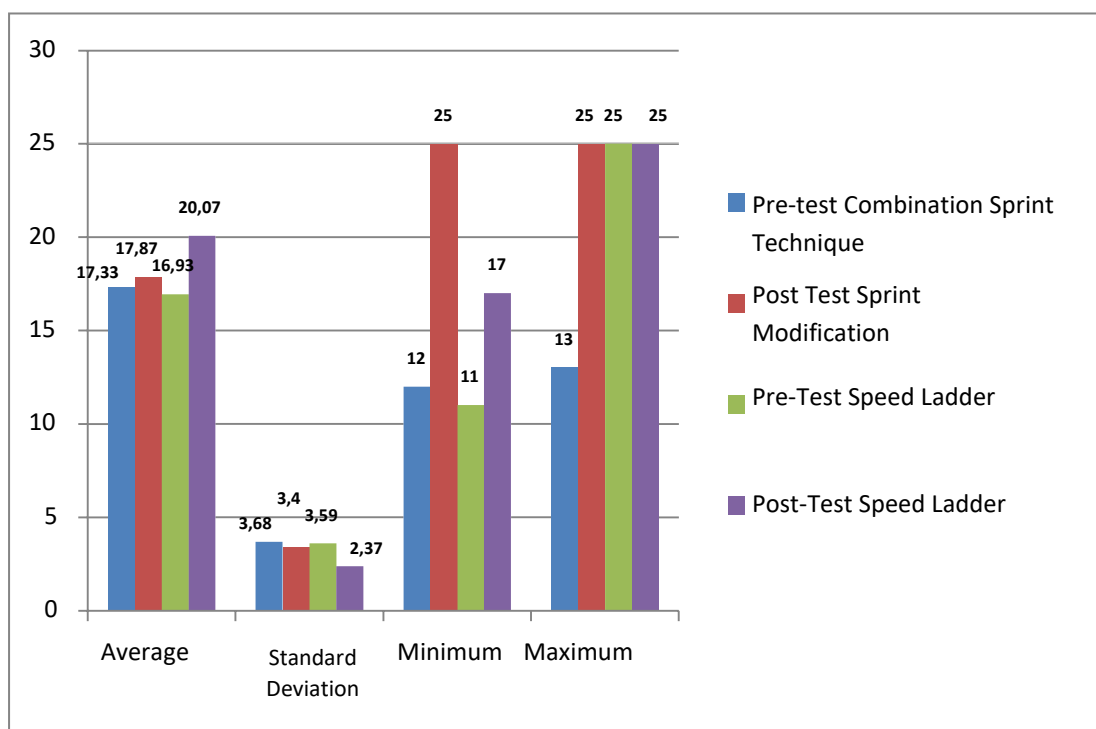


Figure 1. Comparison bar chart of Pre-test Post-Test of each Group

The normality test is a test to find out whether or not the distribution is normal distribution. The step before testing the hypothesis is to first test the requirements of data analysis with a normality test, namely using the Lilliefors Test. The normality test results are as follows.

Table 3. Normality Test

No.	Variable	L <sub>Count</sub>	L <sub>table</sub>	Conclusion
1	Pre-Test Group Sprint modifications	0,208	0,221	Usual
2	Post-Test Group Sprint modifications	0,181	0,221	Usual
3	Pre-Test Group Speed ladder	0,198	0,221	Usual
4	Post-Test Group Speed ladder	0,161	0,221	Usual

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Furthermore, the homogeneity test is carried out to obtain information whether the two sample groups have homogeneous variance or not, Below are the results of homogeneity calculations presented in the following table.

**Table 2. Homogeneity Test**

No.	Variable	L <sub>Count</sub>	L <sub>Table</sub>	Conclusion
1	Pre-Test Group Sprint modifications and <i>speed ladder</i>	1,046	2,40	Homogeneous
2	Post-Test Group Sprint modifications and <i>speed ladder</i>	2,05	2,40	Homogeneous

To find out which variables have the same variance, the test carried out is by comparing the largest variance and the smallest variance from each group so that the calculated F value is obtained with the test criteria, if the test results obtained  $F_{Count} < F_{Table}$ , then both data are homogeneous or come from the same variance. Thus, in the test results obtained  $F_{Count} < F_{Table}$  then the two variances are homogeneous.

### IV. RESULT

In this study, a significant increase was obtained in the group studied. The provision of sprint and speed ladder modification treatment has a significant influence on the kick speed of mawashi geri female kempo athletes in Bandar Lampung City. Mawashi Geri's kicks increased after being given a modified sprint treatment which was shown by a post-test value that was greater than the pre-test value. This training process is designed to train and improve the quality of work of the leg muscles and other muscles that affect in performing mawashi geri kicks. According to (Sepriadi, 2018) suggests that sprint modification exercises require rhythmic contractions of large muscle groups of the legs to move all body weight during sprints. The main goal is to increase the muscle in contracting in performing kicks and is done repeatedly in a careful process by increasing the load (Nenggar, 2016).

At the completion of the research process starting from taking the initial test to the final test, the research results were obtained among others as follows. The effect of technical sprint modification (X1) on the kick speed of mawashi geri female kempo athletes Bandar Lampung City (Y) which shows that there is a significant influence between the two variables mentioned above. In achieving the goals implemented during training, an optimal training program from a trainer is needed. Thus, the success or failure of the goals to be achieved will be influenced by the application of training principles needed in making exercise programs, such as technique sprint modification exercises. This is a novelty in research that the principle of exercise needed is to create an effective exercise program, one of which is the technique sprint modification exercise.

While in the speed ladder training group, according to the results of data analysis, it can be concluded that there is a significant influence of the speed ladder on the kick of mawashi geri female kempo athletes in Bandar Lampung City. Speed ladder is jumping using one or two legs using physical exercise equipment that resembles a ladder child placed on a flat plane or floor done with proper technique and kinetic chain control, to minimize the risk of injury (Juliyanto, 2016). By practicing using a speed ladder, agility will help improve various aspects of basic sports movements such as improving body balance, reflex movements, muscle endurance, reaction speed and coordination between body parts (Cakrawijaya, 2021).

Speed ladder training can be used for mawashi geri kick speed, especially at reaction speed (Ayubi et al., 2022). Reaction speed in athletes is a person's ability to answer stimuli in the shortest possible time (Gultom et al., 2023). Thus, based on the data that has been described, it can be described that the speed ladder group has a greater increase than the technique sprint modification exercise group. So the comparison results of the two groups showed that the speed ladder group was larger than the engineering sprint modification group. This shows a novelty in this study that in speed ladder training agility continuously will help in improving the nervous system, body stamina, and leg muscle strength.

### V. CONCLUSIONS

Research conducted on kempo female athletes in Bandar Lampung City by conducting technical sprint modification exercises and speed ladder exercises to improve mawashi geri kicks concluded that the results of the t test analysis showed that the technique sprint modification exercise had a significant influence on the results of mawashi geri kick speed in Bandar Lampung City kempo female athletes with a calculated t value = 4.08 > t table = 2.042, Furthermore, the results of the t test analysis showed that the speed ladder training had a significant influence on the results of the mawashi geri kick speed in Bandar Lampung City kempo female athletes with a calculated t value = 8.69 > t table = 2.042, and the results of the t test analysis

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showed that the speed ladder training was significantly greater on the speed of mawashi geri kicks in Bandar Lampung City kempo female athletes with a calculated  $t$  value = 2.16 >  $t$  table = 2.048. So the implication of this research is for trainers to make the speed ladder training method and apply it to increase the speed of mawashi geri kicks.

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