



The Effect of Flexibility Training Using Proprioceptive Neuromuscular Facilitation (Pnf) on The Improvement of Flexibility and Accuracy Oo Mawashi Kick Performance in Karate Athletes

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ABSTRACT

This study aims to examine the effect of flexibility training using proprioceptive neuromuscular facilitation on increasing the flexibility and accuracy of karate athletes' mawashi kicks. To determine the effect of proprioceptive neuromuscular facilitation flexibility training on increasing the flexibility and accuracy of karate athletes' mawashi kicks, related to the data obtained by the author, it was measured using a side split instrument and point target with a total of 10 athletes to measure the level of flexibility and kick points obtained by athletes. The methods used in this study are to test statistical data, normality tests, and Paired Sample T-Test. After testing the Pre-Test and Post-Test values, the results of the study showed that the sig value for Side Split was at 0.000 while the sig value for Point Target was at 0.027. From both sig results, it was concluded that the sig value. both were below 0.05, so it can be concluded that there is an effect of flexibility training using PNF on increasing the flexibility and accuracy of mawashi kicks.

Keywords: Proprioceptive Neuromuscular Facilitation, Flexibility, Accuracy, Karate, *Mawashi Geri*.

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INTRODUCTION

The mawashi-geri kick is a fundamental kicking technique in karate used to attack almost all parts of the body. Therefore, it must be trained intensively and regularly through proper flexibility training, as such training directly affects the execution of the mawashi kick. As one of the main techniques in karate, the mawashi kick requires athletes to possess high levels of flexibility and accuracy to ensure effectiveness and precision (Baramuli et al., 2020; Abdussama et al., 2021).

Muscle and joint flexibility greatly influence this ability, and flexibility training using Proprioceptive Neuromuscular Facilitation (PNF) has been proven to effectively improve flexibility at the neuromuscular level (Miyahara et al., 2013; Nuruhidin, 2022). Moreover, PNF techniques can enhance motor coordination and muscle control, which in turn may improve kicking accuracy (Cha & Kim, 2015). This study aims to evaluate the effectiveness of PNF training in improving both flexibility and the accuracy of the mawashi kick in karate athletes.

METHOD

This study employed an experimental design using a One-Group Pretest-Posttest model with purposive sampling. The sample consisted of 10 karate athletes aged 13–16 years. The treatment involved flexibility training using PNF for 3 weeks with a frequency of 4 sessions per week (Akmal Ali et al., 2021). The measurement instruments used were as follows: Side split test to measure flexibility in centimeters (Oktasari et al., 2018). Mawashi kick accuracy assessment, based on scoring points through target kicks (Baramuli et al., 2020).

Data analysis included the Shapiro–Wilk test for normality and the Paired Samples T-Test to determine the difference between pretest and posttest results (Sugiyono, 2015; Suharsimi Arikunto, 2010).

RESULT AND DISCUSSION

RESULT

Table 1. *Descriptive Statistics Side Split Test*

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Side Split	10	8.0	33.0	20.520	8.5819
Pos-Test Side Split	10	5.0	30.0	17.470	8.9224
Valid N (listwise)	10				

Based on **Table 1**, the pre-test side split results show a minimum of 8.0 and a maximum of 33.0, with a mean of 20.520 and a standard deviation of 8.5819. Meanwhile, the post-test side split results show a minimum of 5.0 and a maximum of 30.0, with a mean of 17.470 and a standard deviation of 8.9224. The decrease in the mean value indicates an improvement in flexibility after the treatment.

Table 2. *Descriptive Statistics Point Ttarget Test*

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Point Target	10	42	66	58.00	6.944
Pos-Test Point Target	10	42	78	62.50	10.997
Valid N (listwise)	10				

Based on **Table 2**, the pre-test point target values ranged between 42 and 66 with a mean of 58.00 and a standard deviation of 6.944. In the post-test, the range was 42–78, with

the mean increasing to 62.50 and a standard deviation of 10.997. These findings indicate an improvement in kicking accuracy after the treatment.

Table 3 Normality Test *Side Split (Shapiro-Wilk)*

	Shapiro-Wilk		
	Statistic	df	Sig.
Pre-Test Side Split	.938	10	.536
Pos-Test Side Split	.929	10	.435

Based on **Table 3**, the Shapiro–Wilk significance values for the pre-test and post-test side split were 0.536 and 0.435, respectively. Since both are greater than 0.05, the side split data are normally distributed.

Table 4. Normality Test *Target (Shapiro-Wilk)*

	Shapiro-Wilk		
	Statistic	Df	Sig.
Pre-Test Point Target	.899	10	.212
Pos-Test Point Target	.917	10	.334

Based on **Table 4**, the Shapiro–Wilk significance values for the pre-test and post-test point target were 0.212 and 0.334, respectively. Since both values are greater than 0.05, the point target data are also normally distributed. Thus, the assumption of normality is fulfilled, and the next statistical test used was the Paired Samples T-Test

Tabel 5. (*Paired Sampel Test*) *Side Split*

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	T	df	Sig. (2-tailed)
Pair 1	Pre-Test Side Split - Pos-Test Side Split	3.5951	12.658	9	.000

As seen in **Table 5**, the significance value (Sig. 2-tailed) for the side split was 0.000, which is less than 0.05. This indicates a significant difference between pre-test and post-test results. In other words, the treatment given significantly improved flexibility in the side split movement.

Table 6. Paired Sampel Test Point Target

		Paired Differences			
		95% Confidence Interval of the Difference			
		Upper	t	df	Sig. (2-tailed)
Pair 1	Pre-Test Point Target - Pos- Test Point Target	-.637	-2.635	9	.027

Table 6 shows that the significance value (Sig. 2-tailed) for the point target was 0.027, which is also less than 0.05. This indicates a significant difference between pre-test and post-test results in terms of accuracy. Thus, the treatment was effective in improving the athletes' kicking accuracy

Discussion

PNF training improves flexibility by enhancing neuromuscular ability and optimizing muscle stretching (Miyahara et al., 2013). Increased flexibility allows for a wider and stronger mawashi kick movement, consistent with Oktasari et al. (2018). Additionally, improvements in kicking accuracy are supported by better motor coordination and muscle control gained through PNF training (Cha & Kim, 2015). These findings align with Dewanti (2020) and Hidayatulloh et al. (2024), who also demonstrated the relationship between flexibility and kicking performance in martial arts

CONCLUSSION

Based on the analysis, it can be concluded that in this study, flexibility training using the Proprioceptive Neuromuscular Facilitation (PNF) method significantly improved both flexibility and the accuracy of mawashi kicks among junior karate athletes. It is recommended that coaches incorporate PNF exercises into training programs to enhance athletes' performance

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