

Effect of the Neuromuscular Taping (NMT) towards Flexibility Muscle Functions at the Lower Back and Hamstrings

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Abstract:- Muscle is a contractile tissue of the human body. Moving activities require a good muscular condition so that daily activities can take place normally without any obstacles. Reduced flexibility in the lower back and hamstring muscles will impact human movement activities, especially squatting. Neuromuscular taping (NMT) is a useful taping application technique for stimulating muscle eccentricity. Purpose: of this study was to see the effect of the application of Neuromuscular Taping (NMT) in increasing the flexibility of the muscles of the lower back and hamstrings. Methods: 24 students received neuromuscular tape (NMT) on erector spinae and hamstring muscles. After receiving Neuromuscular taping (NMT), the sample was then instructed to do light activity to activate the effects of Neuromuscular taping (NMT) on the muscles. After 15 minutes, changes in muscle flexibility value were measured. The measurement of the value of muscle flexibility is done using the Sit and Reach test. Result: showed that there was an effect of increasing the flexibility value of erector spine and hamstring muscles between before and after Neuromuscular taping (NMT) application ($P < 0.05$). Conclusion: We found that the application of neuromuscular taping (NMT) can increase the flexibility of the spinal erector muscles and the hamstrings.

Keywords:- Neuromuscular Taping (NMT), Flexibility, Erector Spine, Hamstrings

I. INTRODUCTION

Muscle is one of the important components in life, especially in activity. Muscle is a tissue that has the ability to contract. Approximately 40% of our entire body consists of muscles [1]. The length of the hamstring muscles is thought to play an important role in both the effectiveness and efficiency of basic human movements, such as walking and running. Clinical observations show that limited hamstring flexibility is very common in the general population [2]. Impaired hamstring extensibility is associated with an increased risk of injury to the lower limbs and the incidence of low back pain [3].

Flexibility is defined as the joint range of motion (ROM) that is obtained when a certain force is applied to lengthen the muscles [4]. Flexibility has an important place among health-related physical fitness parameters. Flexibility is an important biomotor skill for enhancing quality of life and functional

independence, and good flexibility has a positive effect on muscles and joints. It is also important to prevent injury, minimize muscle soreness, and increase effectiveness in all physical activities[5].

Adequate muscle spasticity relates to the ability of the muscle to absorb some of the elongation and limit the tension in the myofibrils. Insufficient hamstring flexibility is associated with detrimental changes in lower limb kinematics [6].

Stretching is commonly used to promote changes in muscle length [4]. Stretching exercises have been used in sports medicine and physical therapy to increase hamstring flexibility and joint range of motion (ROM), and improve rehabilitation outcomes [6]. Sometimes the effect of stretching doesn't last long, so several alternative ways are needed to increase muscle flexibility. One of them is the application of Neuromuscular Taping (NMT).

Neuromuscular Taping (NMT) is an innovative method of biomechanical therapy with stimulation of compression and decompression to produce positive effects on the musculoskeletal, neurology, vascular and lymphatic systems [7].

The application of Neuromuscular Taping (NMT) to the skin surface which can last up to 2 days provides a greater opportunity for muscles to be flexible longer. So that the application of this technique is considered effective and efficient in achieving the desired muscle flexibility with a long duration of time.

II. RESEARCH METHOD

This study used the Quasi Experimental method with one group pre-test and post-test design with consecutive sampling techniques. The sample of this study was 20 male and female students from the Abdurrab University physiotherapy study program who voluntarily participated in this study. Inclusion criteria included age between 18 and 30 years, sit and reach test score <30 cm, no neurological manifestations, demonstrated hamstring shortening and no history of hamstring injury or history of lower extremity surgery. Exclusion criteria were fractures in the lower extremities experiencing lower back pain, hematoma. Participants were collected in one treatment group, all of which were examined initially to obtain a value of their muscle flexibility. Then the

Neuromuscular Taping (NMT) application is given and activated for approximately 15-20 minutes and then the value of returning muscle flexibility is measured using the Sit and Reach Test Box measuring instrument. This research was conducted in November 2022.

III. RESULTS AND DISCUSSION

Tables 1 and 2 provide a description of the characteristics of the research sample subjects, including information on their age (years), sex, as well as the results of a descriptive analysis performed using SPSS.

Table 1 Characteristics of Subjects by Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	20	19	22	20.50	0.688

From the table above it can be seen the characteristics of the subjects based on age, the average age is 20.50 years, the youngest is 19 years and the oldest is 22 years.

Table 2 Characteristics of Subjects by Sex

	N	Percentage
Male	10	50 %
Female	10	50 %
Total	20	100 %

Furthermore, the characteristics of the subjects based on gender, namely the distribution of 10 men (50%) and 10 women (50%).

Table 3 Distribution of Values of Erector Spine and Hamstring Muscle Flexibility Before NMT

	N	Mean	Std. Deviation	Minimum	Maximum
Flexibility Before	20	27.785	.9275	26.0	29.4

The average observed Flexibility Value of the Erector Spine and Hamstrings Muscles was 27,785 with a standard deviation of 0.9275, the lowest flexibility value was 26.0 and the highest was 29.4.

Table 4 Distribution of Values of Erector Spine Muscle Flexibility and Hamstrings After NMT

	N	Mean	Std. Deviation	Minimum	Maximum
Flexibility After	20	32.910	1.2004	30.6	35.0

Erector Spine and Hamstrings Muscle Flexibility Value average evaluation is 32.910 with a standard deviation of 1.2004 the lowest flexibility value is 30.6 and the highest is 35.0.

Table 5 Normality Test

	Kolmogorov Smirnov^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Age	.266	20	<,.001	.832	20	.003
Sex	.335	20	<,.001	.641	20	<,.001
Flexibility Before	.105	20	.200*	.965	20	.628
Flexibility After	.135	20	.200*	.667	20	.644

In the data normality test, because the sample used in the study amounted to <50 people, the data normality test used was the Shapiro-Wilk test. From the tests carried out, it was found that there was a P value > 0.05, so Ho failed to be accepted/rejected, so it was concluded that the data was not normally distributed. Furthermore, because the data is not normally distributed, in measuring changes in the Flexibility value of the Erector Spine and Hamstring muscles, the data will be tested using the Non-Parametric Wilcoxon Test. The results are as follows:

Table 6 The Changes in Erector Spine and Hamstrings Muscle Flexibility Values before and after Neuromuscular Taping (NMT) Intervention

Variables	N	Mean	SD	P-Value
Flexibility Before	20	27.785	.9275	.001
Flexibility After		32.910	1.2004	

Based on table 6 from the results of the Wilcoxon test analysis, the values obtained from 20 respondents, namely the average value of Observation flexibility was 27,785, with an

SD of 0.9275, then the Evaluation flexibility value was 32,910, with an SD of 1.2004. As for the P-Value of 0.001 (P<0.05), it can be concluded that there is an effect of the

application of Neuromuscular Taping (NMT) on increasing the flexibility of the Erector Spine and Hamstrings muscles.

Research by Aprilyanti [8] states that the provision of Neuromuscular Taping (NMT) interventions can have an effect on increasing the flexibility of lower back flexion by as much as 83%. So it is proven that there is an increase in lower back flexion flexibility in administrative employees who have a static sitting work pattern. Another study by Kriswanto [9] states that the intervention of the NeuroMuscular Taping (NMT) method can have an effect on increasing the flexibility of back flexion in nurses who have dynamic work patterns.

IV. CONCLUSION

From the research results that have been obtained, it can be concluded that Neuromuscular Taping (NMT) is effective in increasing the flexibility of the Erector Spine and Hamstrings muscles

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