



Comparison of Stretching Exercise Methods and Gender to Improve Flexibility in Sports Performers at Mooja Fitness Center

Suarsana Dwi Payana^{1*}, Tite Juliantine², Hamidie Ronald Daniel Ray³

^{1,2,3}Postgraduate Program/Education University of Indonesia/West Java/Indonesia

^{1,2,3}Jl. Dr. Setiabudhi No.229, Isola, Kec. Sukasari, Bandung City, West Java, 40154.

^{1*}dwisuarsana@gmail.com, ²juliantinetite@gmail.com, ³hamidieronald@upi.edu

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ABSTRACT

The purpose of this research is for knowing the effect of the stretching method and gender on flexibility. Experimental research method with 2x2 Factorial Design design, which consists of two groups, because the research uses two independent variables with two moderator variables. Frankel et. Al (2013:277). Based on the results of data processing and analysis described in the previous chapter, it is known that the PNF stretching method is more effective than the passive stretching method in increasing muscle and joint flexibility for men and women with a difference in the average stretch score of 1.52. Then on the results of the analysis of differences in muscle and joint flexibility between men and women, it is known that there is a significant difference in the average score of muscle and joint flexibility between men and women where the average score for men is 1.96. In both men and women, there was a significant increase in muscle and joint flexibility between before and after stretching using either the passive method or the PNF method. So the authors can conclude that in the results of the study there are significant differences in the average score of muscle and joint flexibility between the PNF method and the passive method. This shows that the PNF stretching method is more effective than the passive stretching method in increasing muscle and joint flexibility in men and women. Utilization of the stretching method can provide a real experience for sports players to increase flexibility by using the stretching method because flexibility is very influential in increasing effectiveness in exercising.

Keywords: *Flexibility; PNF; Stretching Exercises.*

INTRODUCTION

In the world of physical fitness, flexibility continues to be a component of physical health that has not been specifically addressed. It is considered one of the five main components of physical fitness, however, from a physiological point of view, much is still not fully understood. Flexibility, at its simplest, refers to the range of motion that a joint or body segment can perform (Alter, 2004). Various stretching techniques have been adapted into training programs and exercises that seek to increase flexibility. However, the question is, "What are the benefits of increasing flexibility during exercise?". In the

past, it was believed that stretching before exercise or activity helps prevent injury and promote effective performance (Amako, Oda, Masuoka, Yokoi, Campisi, 2003).

Flexibility is the ability of the tissue around the joint to be measured as much as possible without any influence from the opposing tissue and relax. Women have a better level of flexibility than men, which has been proven through Sit and Reach Test measurements. The sit and reach test is a general measure of flexibility, and specifically measures the flexibility of the lower back and hamstring muscles. This test is important because tightness in this area is implicated in lumbar lumbosis, forward tilt of the pelvis, and low back pain. This test was first described by Wells and Dillon (1952).

An important factor that can affect flexibility is lifestyle. In some people have a sedentary lifestyle, which is synonymous with inactivity. Inactivity affects flexibility because if not actively moved, muscles can shorten/atrophy and experience stiffness. In addition, the connective tissue in the joints also experiences the same thing. As a result, flexibility will decrease.

For muscle flexibility to be maintained properly, don't forget to stretch before and after exercising, because by stretching muscle flexibility is maintained. Lack of flexibility (flexibility) is one of the main factors causing less than optimal movement, including the cause of a lot of tension and tearing of muscles in practice. If you stretch regularly, the flexibility of joints and muscles will be maintained, especially for fitness members because heavyweight training activities will cause the body to feel afternoon and inflexible.

Members at Mooja Fitness who do weight training usually only focus on building their bodies to have great strength and muscles while their flexibility is often neglected and untrained. Whereas flexibility is one of the important components that must be trained because it is included in the components of fitness related to health in addition to cardiovascular endurance, muscle strength, muscle endurance, and body composition. Flexibility can be trained with four stretching methods, namely, dynamic, static, passive, and contraction-relaxation or PNF methods.

This condition prompted researchers to introduce various stretching methods to members of Mooja Fitness Center, namely dynamic, static, passive, and contraction-relaxation (PNF) stretching methods. Especially in this study, two kinds of stretching were taken, namely passive stretching and contraction-relaxation (PNF) because in several previous studies these two stretches had better results than other stretches, for example in Juliantine's study, 2002 "a comparative study of various exercise methods.

stretching in increasing flexibility” in this study there were good results for passive stretching and contraction-relaxation (PNF) compared to static and dynamic stretching. Therefore, empirical data is needed to determine the results of the exercise program. A test and measurement are needed to obtain empirical data that shows the level of success of the exercise program. Based on these needs, the researchers chose to conduct research

In connection with the absence of research publications regarding the comparison of stretching exercise methods in increasing flexibility in sports actors at the mooja fitness center based on gender, the researchers took the initiative to make research entitled "Comparison of Stretching Exercise Methods and Gender to Increase Flexibility in Sports Actor in mooja fitness center". This study aims to see the effectiveness of the effect of passive stretching exercises and PNF in increasing muscle and joint flexibility.

METHOD

Referring to this study, the research method that the authors chose and determined, namely experimental research is one of the most powerful research methodologies that can be used by researchers Fraenkel, J. R., Wallen, N. E., & Hyun, H. (2012). In this study, the researchers used a 2x2 Factorial Design, which consisted of two groups, because the researchers used two independent variables with two moderator variables.

The population in this study is a fitness member, namely at the Mooja Fitness Gallery ciumbuleuit, amounting to 350 people. The sample in this study is a fitness member totaling 40 people with the following criteria: a. Member fitness who does bodybuilding exercise, b. Which has a low level of flexibility, c. Which has the greater muscle mass, d. Member fitness consists of 40 men and women. The instrument used in this research is the Sit and Reach.

Table 1
 Research Design

Stretching Method	Stretching Method	
	Passive Stretching (A1)	PNF Stretching (A2)
Gender		
Male (B1)	A1B1	A2B1
Female (B2)	A1B2	A2B2
Flexibility		

Description :

A1: Passive Stretch

A2: Stretching Contraction-Relaxation (PNF)

B1: male

B2: female

A1B1: Group of people (male) doing passive stretching.

A1B2: Group of people (female) doing Passive stretching

A2B1: Group of people (male) doing Contraction-Relaxation (PNF) stretches

A2B2: Group of people (female) doing Contraction-Relaxation (PNF) stretches

RESULTS AND DISCUSSION

Table 2
 Descriptive Statistics of Muscle and Joint Flexibility Score

Stretching Method	N	Min	Max	Average	Std
PNF	20	2,5	13,1	6,97	2,72
Passive	20	3	13	5,45	2,55

Table 2 shows that the average score of muscle and joint flexibility in the PNF group is greater than the passive group, the difference is 1.52. This shows a relatively large difference. For the distribution of muscle and joint flexibility score data, the PNF method is more spread out than the passive method because the standard deviation of the PNF method is larger. The spread of muscle and joint flexibility in the PNF method is 0.17 greater.

Table 3
 Muscle and Joint Flexibility Score Normality Test

Ability aspect	Method	Kolmogorov-Smirnov one sample	Sig.	Conclusion	Information
Muscle and Joint Flexibility	PNF	0,152	0,200	Terima H ₀	Normal
	Passive	0,242	0,003	Tolak H ₀	Abnormal

Basics of Decision Making Normality Test

1. The data is categorized as normally distributed if the significance value is > 0.05
2. The data is not normally distributed if the significance value is < 0.05

The data for the PNF method shows the value of Sig. > 0.05. Thus, H₀ accepted by the PNF method has data that are normally distributed. While the data on the passive method shows the value of Sig. < 0.05 so the data is not normally distributed. Because one of the data is not normally distributed, to test the difference in mean using a non-parametric test, the Mann-Whitney test.

Table 4

Test the difference in the average joint flexibility between the PNF method and the passive method

Ability aspect	Method	Mann-Whitney U	Sig. (2 way)	Sig. (1 way)	Conclusion
Muscle and Joint Flexibility	PNF	120	0,030	0,015	H ₀ Rejected
	Passive				

From the results of the table above, it is known that there is a significant difference in the average score of muscle and joint flexibility between the PNF method and the passive method. This shows that the PNF stretching method is more effective than the passive stretching method in increasing muscle and joint flexibility in men and women.

Table 5

Descriptive Statistics of Muscle and Joint Flexibility Scores in Men and Women

	N	Score Min	Score Max	Average	Std
Men	20	2,5	13,1	7,19	3,2
Women	20	2,9	8	5,23	1,69

Table 5 shows that the average score of muscle and joint flexibility in men is greater than in women, the difference is 1.96. This shows a relatively large difference. For the distribution of data on joint and muscle flexibility scores, the male group was more spread out than the female group because the standard deviation of muscle and joint flexibility in men was 1.51.

Table 6

Test the difference in the average score of muscle and joint flexibility in men and women

Ability aspect	Group	t	Sig. (2 way)	Conclusion
Muscle and Joint Flexibility	Men	2,431	0,020	Rejected H ₀
	Women			

From the results of the table above, it is known that there are significant differences in the average score of muscle and joint flexibility in men and women. This shows that there is a significant difference between muscle and joint flexibility in men and women after stretching using the Passive method and the PNF method.

Table 7

Descriptive Statistics of Male Muscle and Joint Flexibility Scores on Passive Stretching

	N	Score Min	Score Max	Average	Std
Before	10	-10	12,5	1,56	7,79
After	10	-5,6	16,5	8,14	6,78

Table 7 shows that the average score of muscle and joint flexibility after stretching with the passive method is greater than before stretching with the passive method, the difference is 6.58. This shows a relatively large difference. For the distribution of joint and muscle flexibility score data, before stretching with the passive method it is more spread out than after stretching with the passive method because the standard deviation of muscle and joint flexibility before stretching is 1.01 greater.

Table 8
 Test of Average Differences Before and After Stretching with Passive Method

Ability aspect	Method	Mann-Whitney U	Sig. (2 way)	Sig. (1 way)	Conclusion
Muscle and Joint Flexibility	PNF Passive	1,880	0,059	0,0295	Rejected H_0

From the results of the **Table** above, it is known that there is a significant difference in the average score of muscle and joint flexibility in men before and after stretching with the passive method. This shows that there is a significant increase in muscle and joint flexibility in men after stretching using the Passive method.

Table 9
 Descriptive Statistics of Male Muscle and Joint Flexibility Scores on Stretching the PNF Method

	N	Score Min	Score Max	Average	Std
Before	10	-11	13,5	1,56	8,24
After	10	-4	16	8,76	6,32

Table 9 shows that the average score of muscle and joint flexibility after stretching with the PNF method is greater than before stretching with the PNF method, the difference is 7.2. This shows a relatively large difference. For the distribution of joint and muscle flexibility score data, before stretching with the PNF method it was more spread out than after stretching with the PNF method because the standard deviation of muscle and joint flexibility before stretching was 1.92.

Table 10

Test of Average Differences Before and After Stretching with the PNF Method

Ability aspect	Method	Mann-Whitney U	Sig. (2 way)	Sig. (1 way)	Conclusion
Muscle and Joint Flexibility	Before After	1,880	0,029	0,0145	Rejected H ₀

From the results of the table above, it is known that there is a significant difference in the average score of muscle and joint flexibility in men before and after stretching with the PNF method. This shows that there is a significant increase in muscle and joint flexibility in men after stretching using the PNF method.

Table 11

Descriptive Statistics of Female Muscle and Joint Flexibility Scores on Passive Stretching Method

	N	Score Min	Score Max	Average	Std
Before	10	6,3	19,5	14,16	4,28
After	10	11,2	23,3	18,48	4,42

Table 11 shows that the average score of muscle and joint flexibility after stretching with the passive method is greater than before stretching with the passive method, the difference is 4.32. This shows a relatively large difference. For the distribution of joint and muscle flexibility score data, after stretching with the passive method it is more spread out than after stretching with the passive method because the standard deviation of muscle and joint flexibility after stretching is 0.14 greater.

Table 12

Test of Average Differences Before and After Stretching with Passive Method

Ability aspect	Method	Mann-Whitney U	Sig. (2 way)	Sig. (1 way)	Conclusion
Muscle and Joint Flexibility	PNF Passive	2,221	0,039	0,0195	Tolak H ₀

From the results of the table above, it is known that there is a significant difference in the average score of muscle and joint flexibility in women before and after stretching with the passive method. This shows that there is a significant increase in muscle and joint flexibility in women after stretching using the Passive method.

Table 13

Descriptive Statistics of Female Muscle and Joint Flexibility Scores on Stretching

the PNF Method

	N	Score Min	Score Max	Average	Std
Before	10	1,3	19,2	11,43	6,69
After	10	8,4	24,3	17,56	6,09

Table 13 shows that the average score of muscle and joint flexibility after stretching with the PNF method is greater than before stretching with the PNF method, the difference is 5.1. This shows a relatively large difference. For the distribution of joint and muscle flexibility score data, before stretching with the PNF method it was more spread out than after stretching with the PNF method because the standard deviation of muscle and joint flexibility before stretching was 0.6.

Table 14

Test of Average Differences Before and After Stretching with the PNF Method

Ability aspect	Method	Mann-Whitney U	Sig. (2 way)	Sig. (1 way)	Conclusion
Muscle and Joint Flexibility	PNF Passive	2,114	0,046	0,023	Rejected H_0

From the results of the table above, it is known that there is a significant difference in the average score of muscle and joint flexibility in women before and after stretching with the PNF method. This shows that there is a significant increase in muscle and joint flexibility in women after stretching using the PNF method.

CONCLUSIONS AND SUGGESTIONS

Conclusion Based on the results of data processing and analysis that have been described in the previous chapter, the authors can conclude the results of the study as follows. There is a significant difference in the average score of muscle and joint flexibility between the PNF method and the passive method. This shows that the PNF stretching method is more effective than the passive stretching method in increasing muscle and joint flexibility in men and women; There is a significant difference in the average score of muscle and joint flexibility in male and female. This shows that there is a significant difference between muscle and joint flexibility in male and female after stretching using the Passive method and the PNF method; There is a significant difference in the average score of muscle and joint flexibility in male before and after stretching with the passive method. This shows that there is a significant increase in muscle and joint flexibility in male. male after stretching using the Passive method; There

is a significant difference in the average score of muscle and joint flexibility in men before and after stretching using the PNF method. This shows a significant increase in muscle and joint flexibility in male after stretching using the PNF method; There is a significant difference in the average score of muscle and joint flexibility in female before and after stretching with the passive method. This shows a significant increase in muscle and joint flexibility in female after stretching using the Passive method, and There is a significant difference in the average score of muscle and joint flexibility in female before and after stretching using the PNF method. This shows a significant increase in muscle and joint flexibility in female after stretching using the PNF method.

Suggestions Based on the conclusions from the results of the study, several things are recommended by researchers so that this research becomes more useful, including the following: Good flexibility makes muscles and joints healthier. Increasing the elasticity of the muscles and connective tissue around the joints allows for greater freedom of movement and the individual's ability to participate in a wide variety of sports and recreational activities; and For sports institutions and educational institutions to always move or apply the stretching method before or after doing sports activities. To the coaches, when determining the stiffness monofins either in practice or in matches, you should always involve sports science in the determination. Because in the development carried out by monofins manufacturers, it can be proven in more detail when it involves sports science.

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