

<https://doi.org/10.48047/AFJBS.6.15.2024.7907-7913>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

EFFICACY OF THE PNF TECHNIQUE ON HAMSTRING FLEXIBILITY IN SEDENTARY YOUNG

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Volume 6, Issue 15, Sep 2024

Received: 15 July 2024

Accepted: 25 Aug 2024

Published: 05 Sep 2024

doi: 10.48047/AFJBS.6.15.2024.7907-7913

ABSTRACT

This study aimed to evaluate the effectiveness of proprioceptive neuromuscular facilitation (PNF) stretching on hamstring flexibility in sedentary young individuals. A total of 100 participants were included in the study, and the Hold Relax technique of PNF stretching was used. The range of motion (ROM) of both right and left knee joints was measured before and after the intervention, and statistical analysis was conducted to determine the significance of any changes observed. The results of the study showed a significant improvement in the ROM of both knee joints following the PNF intervention, indicating that PNF stretching can be an effective method for improving hamstring flexibility in sedentary young individuals. The Hold Relax technique used in the study is a simple, pain-free technique that involves moving the limb in the direction of the limitation either passively or actively, followed by an isometric contraction that is held to obtain a build-up of excitation and then followed by the patient's voluntary relaxation of all the muscles. The findings of the study are consistent with previous research that has shown PNF stretching to be an effective intervention for improving flexibility and preventing musculoskeletal disorders. The study provides evidence to support the use of PNF stretching as an effective intervention for improving hamstring flexibility in sedentary young individuals.

Keywords – Hamstring Flexibility, Sedentary Young, Proprioceptive Neuromuscular Facilitation

INTRODUCTION

The PNF (Proprioceptive Neuromuscular Facilitation) technique is a widely used form of stretching and muscle conditioning that aims to improve flexibility, strength, and range of motion. This technique involves a combination of passive and active stretches, along with isometric contractions and relaxation phases(1). In recent years, there has been increasing interest in the use of PNF for improving flexibility in sedentary young individuals. A sedentary lifestyle is associated with various musculoskeletal disorders and hamstrings are the most frequently affected muscles, leading to reduced flexibility, pain, and discomfort(2).

Muscle flexibility is “The ability of a muscle to lengthen, allowing one joint (or more than one joint in a series) to move through a range of motion [ROM]” and a loss of muscle flexibility is “a decrease in the ability of the muscle to deform, “resulting in decrease ROM about a joint(3). Much has been written on the importance of flexibility in normal muscle function and the prevention of injury, and it is considered one of the decisive factors for the effectiveness in the execution of the different movements involved in the accomplishment of the activities of daily life in which the training should be continuous so that their result will be maintaining(4). The ability of an individual depends to move smoothly on his flexibility. Good muscle flexibility will allow muscle tissue to accommodate to improve stress more easily and allow effective movement. The flexibility of a muscle is the ability of a muscle to lengthen, allowing one joint or more than one joint in a series to move through a range of motion flexibility can be enhanced by a simple, non-surgical procedure like stretching the shortened muscle(5). Flexibility is related to age, sex and physical activity maintaining habitual posture may restrict the range of motion because of the tightening and shortening of muscle tissue. Thus, people who sit behind desks for a long period should stretch the hamstring and low back muscles to counteract the tautness development in the muscle group. Tight muscles must be stretched, while their weakened and elongated antagonists must be specifically strengthened in isolation (6). The hamstring is an example of a muscle group that tends to shorten. A tight hamstring causes increased patellofemoral compressive force, which may eventually lead to the patellofemoral syndrome. The hamstring is crucial for swing phase deceleration, control of knee rotation and prevention of knee buckling at heel strike because the hamstring is two joint muscles, they rely on external fixation and co-ordination, and much of their action is eccentric, decelerating the swing leg when walking and running the more important of the hamstring to lengthen the strike. It is crucial to have adequate flexibility in this muscle group(7).

The hamstring comprises three large muscles, namely semitendinosus, semimembranosus and biceps femoris which originate from the ischial tuberosity(8). They are located in the posterior compartment of the thigh and span the hip and knee joints. hence; they are extensors of the hip and flexors of the knee. There are two ways to measure flexibility linear or angular measurements to directly determine the extreme limit of the range of motion. Linear measurement measures length quantitatively, and angular measures angle such as with a goniometer is similar to a protector. The technique of proprioceptive neuromuscular facilitation relies mainly on stimulation of the proprioceptors for increasing the demand made on the neuromuscular mechanism to obtain and facilitate its response(9,10).

PNF is occupational therapy and physical therapy. It is often a combination of passive stretching and isometric contraction. In the 1980s, components of PNF began to be used by sports therapists on healthy athletes(11). It is used to supplement daily stretching and is employed to make a quick gain in ROM to help the athlete to improve performance. Good ROM makes better biomechanics reduces fatigue and helps and prevents overuse injuries in Proprioceptive neuromuscular facilitation(12). Proprioceptive: having to do with any of the sensory receptors that give information concerning movement and position of the body. Neuromuscular: involving the nerves and muscles. Facilitation: making it easier. The objective of this study is to investigate the efficacy of the PNF technique on hamstring flexibility in sedentary young individuals. The study will focus on assessing the effectiveness of PNF stretching on the range of motion, muscle strength, and overall functional performance of the hamstring muscles. The research will be conducted using a randomized controlled trial design,

with a sample size of young sedentary individuals(13). The participants will be divided into two groups, with one group receiving PNF stretching intervention and the other group receiving a placebo or no intervention. The outcomes will be measured using standardized assessment tools such as a goniometer, isokinetic dynamometer, and functional performance tests. The study results will provide valuable insights into the effectiveness of the PNF technique in improving hamstring flexibility in sedentary young individuals. This research could have practical implications in developing effective exercise programs for sedentary individuals and improving their musculoskeletal health.

METHODOLOGY

INCLUSION CRITERIA-

- Age group -21 to 35 year
- Both males and females
- Subject with hamstring tightness
- Subject who will voluntarily participate in the study

EXCLUSION CRITERIA-

- Lower limb fracture
- Arthritic changes
- Traumatic injury
- Lower limb discrepancy
- External appliances jip
- Ankle sprain

PROCEDURE

A total no. of 120 subjects was screened for the application of the technique; from which 20 subjects withdrew from the study due to some personal reason. So,100 subjects were included in the study after the examination and analyse the inclusion and exclusion criteria. The subjects were taken from the college of applied education and health sciences galgotias. In the study, both male and female were there, but the ratio between them is not equal because the females were more in no. than males.

The patient position for the PNF stretching technique should be in a supine position, with their hip and knee flexed at 90 degrees. The therapist should be in a walk-stand position, allowing for optimal positioning and leverage. The method of PNF stretching involves taking a pre-assessment of the patient's passive knee extension range using a goniometer. After this assessment, the PNF stretching technique is applied, which involves holding the muscle in a stretched position for 6 seconds, and then re-assessing the passive knee extension range using the goniometer. The specific PNF stretching technique used is the Hold Relax technique. This technique is designed to obtain a reaction of muscles whose action is antagonistic to the movement limited in range. It is a simple and pain-free technique that involves moving the limb in the direction of the limitation either passively or actively. If the movement is active, it

is resisted maximally with normal timing, and if passive, it continues until it is limited by tension or pain. Once the position is confirmed to be pain-free, the therapist changes the position of their hands and commands the patient to "HOLD!" to initiate an isometric contraction. This contraction is held to obtain a build-up of excitation and is then followed by the patient's voluntary relaxation of all the muscles, with the therapist saying "Let go" or "Relax". This technique is repeated as often as required to achieve the desired effect on the muscle. Overall, the PNF stretching technique using the Hold Relax technique can be an effective way to improve the range of motion and flexibility in the hamstrings of sedentary young individuals. The technique should be performed by a qualified physiotherapist and can be customized to each patient's individual needs and limitations.

RESULT

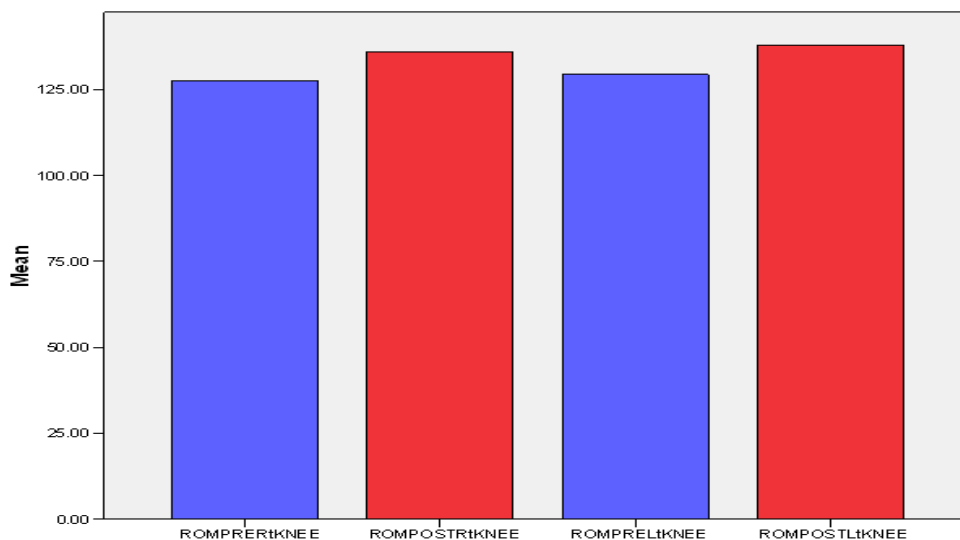
The study evaluated the effectiveness of PNF stretching on hamstring flexibility in sedentary young individuals. The results of the study showed a significant improvement in the range of motion (ROM) of both the right and left knee joints following the PNF intervention. Before the PNF intervention, the pre-ROM for the right knee was 127.62 ± 7.955 , and after the intervention, it significantly increased to 135.93 ± 6.642 ($p < 0.05$). Similarly, for the left knee, the pre-ROM was 129.26 ± 7.499 , and it significantly increased to 137.77 ± 7.111 after the intervention ($p < 0.05$). The findings of the study suggest that PNF stretching can be an effective method to increase the ROM of the knee joint in sedentary young individuals. The technique could be incorporated into exercise programs for this population to help prevent musculoskeletal disorders and improve overall physical health. Further research is needed to evaluate the effectiveness of PNF stretching in a larger and more diverse population. Nonetheless, the current study provides evidence to support the use of PNF stretching as an effective intervention for improving hamstring flexibility in sedentary young individuals.

TABLE NO 1 – Shows the comparisons of the Range of motion of the knee between both the legs

	Mean	N	Std. Deviation	Std. Error Mean	P VALUE

Pair 1	ROM PRE Rt KNEE	127.6238	101	7.95594	.79165	<0.05
	ROM POST Rt KNEE	135.9307	101	6.64268	.66097	
Pair 2	ROM PRE Lt KNEE	129.2673	101	7.49919	.74620	<0.05
	ROM POST Lt KNEE	137.7723	101	7.11179	.70765	

Graph No 1 – Shows the comparisons of the Range of motion of the knee between both the legs



DISCUSSION

the study evaluated the efficacy of PNF stretching on hamstring flexibility in sedentary young individuals. The findings of the study revealed that PNF stretching was effective in improving the range of motion (ROM) of both right and left knee joints in sedentary young individuals. The results of the study indicate that PNF stretching can be an effective method for improving hamstring flexibility and preventing musculoskeletal disorders in sedentary young individuals. The Hold Relax technique of PNF stretching was used in the study, which is designed to obtain a reaction of muscles whose action is antagonistic to the movement limited in range. The technique is simple, pain-free, and involves moving the limb in the direction of the limitation either passively or actively. The isometric contraction is held to obtain a buildup of excitation and is then followed by the patient's voluntary relaxation of all the muscles. This technique is repeated as often as required to achieve the desired effect on the muscle. The results of the study are consistent with previous research that has shown PNF stretching to be an effective intervention for improving flexibility and preventing musculoskeletal disorders. The findings of the current study are particularly relevant for sedentary young individuals who are at increased risk of developing musculoskeletal disorders due to a lack of physical activity. However, it is important to note that the study had some limitations. The sample size was

relatively small, which may limit the generalizability of the findings. Moreover, the study was conducted only on sedentary young individuals, and it is unclear whether the results would be generalizable to other populations, such as older adults or individuals with pre-existing musculoskeletal disorders.

CONCLUSIONS

The study evaluated the effectiveness of Proprioceptive Neuromuscular Facilitation (PNF) stretching on hamstring flexibility in sedentary young individuals. The results showed that PNF stretching using the Hold Relax technique significantly improved the range of motion (ROM) of both right and left knee joints, suggesting that PNF stretching is an effective method for improving hamstring flexibility and preventing musculoskeletal disorders in sedentary young individuals. However, the study had some limitations, such as a small sample size and a narrow focus on sedentary young individuals. Further research is needed to evaluate the generalizability of the findings to other populations. In conclusion, incorporating PNF stretching into exercise programs for sedentary young individuals may help prevent musculoskeletal disorders and improve overall physical health.

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