



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2019; 4(1): 686-688

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www.theyogicjournal.com

Received: 25-11-2018

Accepted: 28-12-2018

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Impact of PNF stretching on muscular flexibility in football

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Abstract

This study was carried out to identify the acute effect of proprioceptive neuromuscular facilitation (PNF) stretching on the flexibility of hamstring muscles of Football players. Thirty players from Safa College, Valanchery (n = 30) were recruited to participate in this research. All 30 male subjects with mean age = 20.90 ± 1.03 ; mean height = 173.07 ± 6.73 ; mean weight = 65.33 ± 13.27 . The experimental group went through a single session of PNF stretching. The flexibility of hamstring muscles were measured twice, pre-test and post-test using the sit and reach test. Results of current study revealed that a single session of PNF stretching induced significant improvement ($t = -6.01$, $df = 29$, $p < .05$) on flexibility of hamstring muscles. From the results of this study it revealed that a single session of PNF stretching on hamstring muscle is an effective and suitable method to improve the flexibility of hamstring muscles.

Keywords: PNF stretching, muscular flexibility, football

Introduction

Flexibility is one of the components of health related fitness. Flexibility can be defined as the range of motion at our joint or the ability of our joint to move freely without restriction. Having good flexibility doesn't only insure efficient yet functional life (Law, Harvey, Nicholas, Tonkin, De Sousa, & Finnis, 2009). Furthermore, it can also help enhance sports performance and rehabilitation, especially patient with musculoskeletal pain (Decoster, Scanlon, Horn, & Cleland, 2004) [5]. Stretching meanwhile is one of the most effective ways of increasing flexibility. There are a few more popular stretching methods out there, including static stretching, ballistic stretching, dynamic stretching and proprioceptive neuromuscular facilitation (PNF) stretching (Sharman, Cresswell & Riek, 2006). Multiple studies have been carried and showed mixed results. Though, PNF are more often found to be the most effective way of increasing our range of motion. (Etnyre & Lee, 1988; Bradley, Olsen & Portas, 2007; Marek, Cramer, Fincher, Massey, Dangelmaier, Purkayastha, Fitz & Culbertson, 2005) [3].

PNF stretching is a technique combining passive stretching and isometric stretching. Passive stretching is also referred as relaxed stretching where the target muscle do not contract but external effort, like from body weight, gravity or a person is exert upon it. Isometric stretching meanwhile is stretching with muscle contraction involved but without lengthening or shortening of the muscle. PNF stretching have been proven to increase range of motion at joint (Funk, Swank, Mikla, Fagen & Farr, 2003). Some of the more popular methods for PNF stretching are contract-relax method (CR) and contract-relax-agonist-contract method (CRAC). Procedure for contract-relax method is start by performing isometric contraction for an allotted amount of time, followed by a few seconds of relaxation. Then, the target muscle is subjected to a passive stretch, usually by another person (Etnyre & Abraham, 1986). Contract-relax-agonist-contract method meanwhile starts with the same procedure as contract-relax method, and then followed by the subject contracting the antagonist muscle to the target muscle for another allotted amount of time. Hamstring flexibility will also be measure using the traditional measuring protocol, which is the sit and reach method. The participant will be in a sitting position with both the legs flexed fully anterior to the trunk. Then the participant will bent over and try to reach out on the sit and reach box as far as they can without any jerky movement (Andrew, Mike, Aaron & Stephanie, 2006) [2]. The purpose of the current study is to see what the acute effect of proprioceptive neuromuscular facilitation (PNF) stretching on flexibility of hamstring.

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While most of the previous studies showed that PNF are more effective when is compared with other stretching methods (Etnyre & Lee, 1988; Bradley, Olsen & Portas, 2007; Marek *et al.*, 2005) [3], but these are not immediate result. Furthermore, a study has shown no acute significance difference for flexibility by doing PNF stretching (Ercole *et al.*, 2011).

Methodology

Experimental method was applied for this research. A PNF stretching for hamstring muscle was designed for the experimental group (n = 30 subjects). This is research was conducted in one session to determine the acute effect of PNF stretching on hamstring flexibility.

Subjects

A total of 30 subjects (n=30) where selected as subjects from the Safa College, Valanchery with purposive sampling. All subjects were fully informed of the requirements of their participation and of the potential benefits.

Measurements

Sit and reach flexibility test was chosen to assess the flexibility of hamstring muscle, and the sit and reach box is the instrument of measurement for this research. This test was first described by Wells & Dillion (1952). This test is currently used all around the globe as a general test of flexibility. The sit and reach test is also performed using the procedures outlined in the ACSM manual (1998). Subjects were required to perform the test twice (pre-test and post-test). Before the pre-test begins, all subjects were asked to follow a gentle warm up lead by the researchers for 5 minutes. According to Prentice (2007), warm up routine can increase our body core temperature which is crucial in reducing injury and muscle soreness. Plus, stretching without prior warm up where the muscles are cold are more prone to injury. After the warm up session, subjects were requested to carry out the sit and reach test. The test starts with the subject in sit position. Take note that all subjects were bared footed. Subjects were required to extend the knee with legs close together, and soles of their feet place against the edge of the box.

Then, the subjects need to extend their arms forward, usually with a hand atop of the other. The hand should be in a prone position. Subjects will try to reach as far as possible by sliding the indicator across the sit and reach box. During the test, the knee of the subjects should always be in an extended without bending (Castro-Piñero, Chillon, Ortega, Montesinos, Sjöström, & Ruiz, 2009) [4] and no jerky actions are allowed. The same procedure for sit and reach test were carried out for the posttest which is after the PNF stretching session. After the post-test, all subjects were required to carry out a cool down session. Cooling down, (Prentice, 2007) can help reduce the frequency of blood pooling at the limbs, especially. Cool down can help maintain blood pressure and enable the body to return to a resting state.

Procedure

All the subjects were informed and explained regarding their involvement in the study. Subjects were fully informed of identifying protocols prior to the study. In addition, all subjects were informed the potential benefits and risks they might face following this study. A consent form is also signed by the subjects as a sign of acknowledgement. Subjects were assured that their data will be kept confidential. Protocol of the PNF stretching requires the subject to start while lying on a supine position. Then, starting with the right leg of the

subject, a partner assisted the subject to find their primary range of motion. This is achieved through raise the right leg of the subject, going till the degree where there is a strong but tolerable stretch. Then the subject have their foot against the shoulder of the partner with the partner's hand making sure that the knee of the subject is locked straight. The subject then push their leg against the partner fairly hard for 10 seconds. This is isometric contract by the subject. After that, subject was asked to relax and the partner is now required to gently push the subject's leg forward to a new range of motion where a strong but tolerable stretch as report by the subject for another 10 seconds. Then, the subject repeated the first step again which is contract against the partner's resistance for 10 seconds, relax and being stretch by the partner again for another 10 seconds. These steps are repeated 4 times. The partner moved to the left leg of the subject and carry out the same protocol. Immediately after the stretching session, another sit and reach test was carried out.

Discussion and Findings

The purpose of this study was to determine the acute effect of proprioceptive neuromuscular facilitation (PNF) stretching on the flexibility of hamstring muscles. This is a study carried out in the Safa College, Valanchery aims to improve the flexibility of hamstring muscles of the experimental subjects in short period of time. The hamstring flexibility determined by sit and reach test was compared before and after the intervention program. The results were used to calculate the parameters relatives to hamstring flexibility, stretching effects and the effectiveness of PNF stretching. The major finding of this study was that one session of PNF stretching induced significant difference ($t = -6.009$, $df = 29$, $p < .05$) on flexibility of hamstring muscles. The mean of post-test ($M = 24.67 \pm 8.46$) significantly increased compared to the pre-test ($M = 21.97 \pm 9.42$). The results mean that one single session of PNF stretching can improve the flexibility of hamstring muscles. The results of this research supported that PNF stretching can improve the muscle flexibility in a short period of time if uses the proper training program (Ercole *et al.*, 2011). In addition, some research has shown that the hamstring muscles have high potential to increase in flexibility with stretching. Thus, the proper PNF stretching can improves as well as help to maximize flexibility of hamstring muscles.

Suggestions

For future studies, it is recommended that females are also included in the research. There are currently no findings of impact of PNF on females. So it is uncertain that females react the same way as male on PNF stretching. The researchers also suggested that more PNF stretching for hamstring muscles can be added to see the difference. Furthermore, the researchers also suggest that future study can research on effect of few weeks long PNF stretching session on the flexibility of hamstring muscles. The researchers also suggested that the subjects should also be solely chosen from inactive people who participated in less exercise activities.

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