



EFFECT OF STATIC STRETCHING AND PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION STRETCHING ON HAMSTRING FLEXIBILITY

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ABSTRACT

The purpose of the study was to find out the effect of Static Stretching and Proprioceptive Neuromuscular Facilitation (PNF) Stretching on the Hamstring flexibility of the selected Higher Secondary students. 90 girls' students of Government Higher Secondary school, Vattiyoorkavu, Thiruvananthapuram in the age group of 15 to 17 years were selected as subject. The subjects were selected at random and they were divided in to three equal group. The first two groups were experimental group consisting of 30 subjects each and they were assigned the technique of static stretching and PNF stretching. The third group was given an organized training program of 40 minute duration for three days in a week. Every session were preceded by a 5 minute warming up session. The data was collected for each subject before and after the training. The data collected from the training groups were analyzed to find out the significance of difference between the paired means of post test score of experimental group and control group. F ratio and Scheffer's Post-Hoc test were computed at 0.05 level of significance. The result of the study shows that there is a significant difference in hamstring flexibility between the post test and pre test of both the group and it further found that the flexibility of the PNF group increase much better than the static group.

Keywords: Hamstring flexibility, static stretching, PNF stretching

INTRODUCTION

The flexibility of the different muscles of the body is very much important for the success in different sports. The hamstring flexibility is found to be one of the important pre requisite for success in various sports events. Poor flexibility will result in a direction of the functional capacity of the body and can contribute to the poor posture, reduced shock absorbing capacity of the body and may predisposes the body to common health problems such as lower back pain, neck pain etc accompanying aging lack of flexibility is a major cause of injury such as muscle strains and tendonitis. The studies found that a daily stretching program reduced the incidence of overuse injury. It also shows that flexibility reduced in both acute and over use injuries. Improvement of flexibility is one of the more effective methods of injury prevention. There were different method of training were used in sports to improve the flexibility of hamstring muscles. For the purpose of the study the static and Proprioceptive Neuromuscular Flexibility(PNF) stretching training were selected to find out the effect of stretching on selected higher secondary students. For the purpose of the study seven static stretching exercises and six PNF stretching exercise



were selected and applied to the subjects of the study.

METHODOLOGY

Ninety (90) female students were randomly selected from Government Higher Secondary School, Vattiyorkavu, Thiruvananthapuram district in the age group of 15 to 17 years. All the subjects were underwent a pre –tests (sit and reach test according to the procedure described in the AAHPERED health related fitness manual, (1980). They were divided in to three equal groups. The first two groups were experimental group. They were given static, PNF stretching exercise randomly for 6 weeks. The third group was the control group. The experimental group was given an organized training program of static stretching for 40 minutes duration for three days a week. The training program was proceeded by a 5 minutes warming up session. The data was analyzed using analysis of co- variance and Scheffer's post- hoc test were applied to determine the significant difference between the mean.

FINDINGS

In order to find out the effect of training on the improvement of hamstring flexibility of the static stretching and PNF stretching on experimental and control group the pre-test and post test mean were compared using the 't'-test.

The level of performance of the subject in the static stretching and (PNF) stretching on the experimental and control group after the post – test were compared. F ratio was significant. Post hock test was used to find out if any variation exists in three groups. In all cases 0.05 level of significance was selected.

TABLE 1
COMPARISON OF MEANS OF PRE –TEST SCORE OF
STATIC STRETCHING GROUP

Test	Mean	SD	t - Value	2 trial prob
Pre test	23.700	4.648	19.76*	0.00
Post test	32.00	5.650		

Significant at 0.05 level of Significance

The Post test mean (32.00) was significantly higher the Pre-test mean (23.70) for static stretching group. The t-value (19.76) proved that the static stretching improved the flexibility of hamstring significantly.

TABLE 2
COMPARISON OF MEANS OF PRE & POST TEST SCORES
OF PNS STRETCHING GROUP

Test	Mean	SD	t - Value	2 trial prob
Pre test	23.700	4.940	25.82*	0.000
Post test	35.400	5.828		

Significant at 0.05 level of Significance

The table demonstrates that the Post test mean (35.400) was significantly higher than the Pre test mean (23.700) for the PNF stretching group. Hence the t- value (25.82) proved to be highly significant ($P < .05$) as compared to the tabulated t- value (2.045) at 29 degree of freedom and 0.05 level of significance.

TABLE 3
COMPARISON OF MEANS OF PRE & POST TEST SCORES
OF CONTROL GROUP

Test	Mean	SD	t- Value	2 trial prob
Pre test	23.700	2.491	1.37	0.184
Post test	23.900	2.736		

Significant at 0.05 level of Significance

The table shows that the post test mean (23.900) was not significantly higher than the control group. t- value (1.37) proved not to be highly significant ($P > .05$) as compared to the tabulated value (2.045).



TABLE 4
ANALYSIS OF VARIANCE OF MEAN DIFFERENCE OF POST
TEST SCORES OF STATIC STRETCHING P
NF STRETCHING AND CONTROL GROUP.

Significance of variance	df	Sum Square	Mean Square	F -Value
Between group	2	2094.2	1047.1	41.3724*
Within group	87	2201.9	25.30	

*Significant at 0.05 level of Significance

The table 4 shows that the calculated F value (41.3724) proved to be highly significant ($P < 0.05$) as compared to be tabulated F value (3.10) at 2,87 degree of freedom at 0.05 level of significance. Hence there were significant differences among the three groups in hamstring flexibility following training.

TABLE 5
SIGNIFICANT DIFFERENCE BETWEEN THE PAIRED MEAN
OF STATIC STRETCHING PNF STRETCHING AND
CONTROL GROUPS

Static stretching group	PN Stretching group	Control group	Mean difference	Critical Difference
32.00	35.40		3.4	3.234
32.00		23.90	8.1	3.234*
	35.40	23.90	11.5	3.234*

*Significant at 0.05 level of Significance

It is observed from the above table that there was significant difference between the mean of post test scores of static stretching, PNF Stretching and control group at 0.05 level of significance.

CONCLUSION

The static stretching and PNF Stretching can be used to bring about desirable and significant changes in the hamstring flexibility of sportsmen as well as sedentary men through continues training. The PNF Training has improved the significantly the hamstring

flexibility of the experimental group compared to the static stretching group because of the neuromuscular physiological mechanism involved in the stretch reflex. From the study it was further revealed that the Proprioceptive Neuromuscular Flexibility stretching should be more effective than static stretching for improving the hamstring flexibility. As physiological and mechanical characteristics of all muscles in the human body are the same. What ever are proved for the hamstring muscles will be true for all other muscles. Hence the PNF Stretching can be recommended to increase the flexibility of all muscles in the human body that are associated with a particular movement. Regular PNF Stretching exercise enables the muscles to improve and maintain the required flexibility.

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