Effects of proprioceptive neuromuscular facilitation technique among college male students with hamstring tightness – comparative study

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Abstract-
Aim of The Study*:* To compare the effects of proprioceptive neuromuscular facilitation technique among college male students with hamstring tightness.
Background of the study: Flexibility is defined as the ability of the muscles to lengthen allowing one joint or more than one joint in a series to move through a range of motion [(1)]. Flexibility allows tissue to accommodate more easily to stress thus minimizing or preventing muscle injury [(1)]. But this study sought to identify the study to compare the effectiveness of contract relax technique and hold relax technique over the hamstring flexibility.
Materials and Methods: 30 male adults with Hamstring tightness aged 20 to 30 years selected from general population through simple randomized technique. Samples are divided into two groups, no.=15 (Group CR) Contract relax with Static stretch and no.=15 (Group HR) Hold relax with Static stretch.
Outcome Measures: Active knee extension (AKE) test and V-sit and reach test.
Results: Subjects in contract relax group showed significantly greater hamstring flexibility compared with the hold relax group. ($p<0.01$).
Conclusion: Both contracts relax and hold relax technique can cause significant result in hamstring flexibility, further comparison shows significant difference between two groups and concludes that contract relax is better than hold relax technique for hamstring flexibility.

***Keywords*- Hamstring Flexibility, Hamstring tightness, V-Sit and Reach test, Active knee extension test, proprioceptive neuromuscular facilitation technique**

INTRODUCTION

Flexibility of hamstrings is important for general health and physical fitness; which is improved by stretching. [(4)] It is a major muscle that control the movement of the hip and knee joints and control the alignment of the pelvis and spine. So, they play an important role in postural alignment where the shortening of the hamstrings could result in a posterior pelvic tilt and hypo lordosis of the lumbar spine. [(5)] A strong relationship has been shown between limited hamstring flexibility and the incidence of low back pain. [(5)] The prevalence of hamstring muscle tightness is fairly high and appears to be increasing among the youth. Because hamstring tightness affects body posture, resulting in musculoskeletal pain, it is important to develop a new effective way to improve hamstring flexibility. [(5)] Lower hamstring extensibility in men when compared to women is explained by differences in stretch tolerance. [(6)] Many stretching techniques are being used for hamstrings flexibility, including static stretching, dynamic stretching (e.g., ballistic stretching) and pre-contraction stretching (e.g., proprioceptive neuromuscular facilitation techniques). [(4)] Static stretching is a commonly used method of stretching in which soft tissues are elongated just beyond the point of tissue resistance and then held in the lengthened position with a sustained stretch force over a period of time.[(2)] With the hold relax procedures in PNF , the range limiting target muscle is first lengthened to the point of tissue resistance or to the extent that is comfortable for the patient. [(2)] With the contract relax procedures in PNF , the range limiting target muscle is first lengthened to the point of tissue resistance or to the extent that is comfortable for the patient. [(2)] Active knee extension (AKE) test is an accurate tool for the assessment of Hamstring muscle length, when the clinician wishes to minimize pelvic motion.[(7)]

MATERIALS AND METHOD

Study Design: experimental study
Study Setting: outpatient department, Cherraan's college of physiotherapy, Coimbatore.
Study Duration: 3 months.
Sample Size: 30 subjects
Sampling Method: randomized controlled trial
Inclusion criteria: Male students, 21-30 years age group, Non-sports person & non yogic person, Hamstring tightness & Positive test of Forward bending test
Exclusion criteria: Female students**,** Age above 30 years**,** Any recent fracture of lower limb**,** Recent injury to Hamstring tendon**,** Recent Hamstring strain and Rupture of hamstring tendon, Deformity of lower limb

Outcome Measurement: V-Sit and Reach test, Active knee extension test

PROCEDURE

The 30 subjects who fulfill the inclusion criteria were randomly allotted into two groups; Group CR for contract relax and Group HR for hold relax. All the subjects had attended the trail session two days before the actual test. Both the groups (GROUP CR n =15) & (GROUP HR n = 15) undergone pre-test with the help of V- sit and reach test and active knee extension test to find out the hamstring flexibility before training and recorded as pre-test score. The treatment was given for a period of 6 weeks in alternative days. The study was conducted for a period of 3 months. After 3 months Both the groups (GROUP CR & GROUP HR) undergone post-test with the help of V- sit and reach test and active knee extension test to find out the hamstring flexibility. The distance reached by the patient was recorded and best of 3 tries was taken as final score in V- sit and reach test for data analysis.

INTERVENTION

The group CR had been trained with contract relax stretch for 30 secs, concentric contraction 15 secs, relax- 10 secs for 2 sessions in a day and 5 days in a week and it was continued for 6 weeks in alternative days. The group HR had been trained with hold relax stretch for 30 secs, isometric contraction 15 secs, relax-10 secs for 2 sessions in a day and 5 days in a week and it was continued for 6 weeks in alternative days. Both groups received static stretch for 30 secs along with their respective PNF technique.

DATA ANALYSIS

The pre-test and post-test measurements were taken for 30 subjects. The subjects were assessed initially and then at the end of 6th week. The collected data was tabulated and analyzed using descriptive statistical method. The findings were summarized as follows:

TABLE NO 1: COMPARISON BETWEEN PRE-TEST AND POST-TEST VALUES OF V SIT AND REACH TEST AND ACTIVE KNEE EXTENSION TEST FOR GROUP CR

OUTCOME	TEST	MEAN	STANDARD DEVIATION	t VALUE	p VALUE
VSRT	PRE TEST	13.913	0.469	36.558	<0.01
	POST TEST	18.34			
AKET	PRE TEST	53.27	5.667	14.762	<0.01
	POST TEST	31.67			

TABLE NO 2: COMPARISON BETWEEN PRE-TEST AND POST-TEST VALUES OF V SIT AND REACH TEST AND ACTIVE KNEE EXTENSION TEST FOR GROUP HR

OUTCOMES	TEST	MEAN	STANDARD DEVIATION	t VALUE	p VALUE
VSRT	PRE TEST	14.28	0.2876	26.758	<0.01
	POST TEST	16.267			
AKET	PRE TEST	51.47	3.09	14.455	<0.01
	POST TEST	39.93			

TABLE NO 3: COMPARISON BETWEEN POST-TEST VALUES OF BOTH GROUPS

GROUP		MEAN	STANDARD DEVIATION	t VALUE	p VALUE
V - SIT AND REACH TEST	Group CR	18.34	0.389	17.185	<0.01
	Group HR	16.267			
AKET	Group CR	31.67	4.564	6.0426	<0.01
	Group HR	39.93			

RESULT

According to the table, the mean value and standard deviation of V sit and reach test values for group CR is 18.34 ± 0.469 and the mean value and standard deviation of V sit and reach test values for group HR is 16.267 ± 0.2876. It was observed that there is a significant difference between the pre test and post test values of V sit and reach test in Group CR and Group HR with paired t value of 36.558 and 26.758 respectively. The mean value and standard deviation of Active knee extension test values for group CR is 31.67 ± 5.667 and the mean value and standard deviation of Active knee extension test values for group HR is 39.93 ± 3.09. It was also observed that there is a significant difference between the pre test and post test values of Active knee extension test in Group CR and Group HR with paired t value of 14.762 and 14.455 respectively. Further comparison of the post test values of the group CR and group HR showed a significant difference between the outcomes of two groups with unpaired t value (Independent t test) of 17.185 (V sit and reach test) and 6.0426 (Active knee extension test).

DISCUSSION

The study investigated the effect of 6 weeks flexibility enhancement programme by giving contract relax technique and hold relax technique along with static stretching on hamstring flexibility. Result shows a significant improvement in both the groups; while

comparing between the two groups, contract relax technique showed a better result than hold relax technique. An analysis with unpaired t test for the post test shows a 'p' value of 0.0001 that is significant. This study found that contract relax PNF was more effective in increasing hamstring extensibility. The previous study on this issue, have found no difference between the two methods of stretching.[10] The discrepancy between our study and the previous ones could be explained by several issues. The treatment duration in our study is 6 weeks which is relatively more than Nagarwal's study which is 3 weeks. Nagarwal A. K. et al, has stated that both the techniques: PNF hold relax and PNF contract relax are almost equal in their clinical effectiveness for improving hamstring flexibility and it is said that either of the techniques may be used in clinical practice for improving hamstring flexibility.[10] J.BrentFeland et al study says that difference was significantly greater in contract relax PNF technique, which is similar to our study.[11]

CONCLUSION

The mean value and standard deviation of V sit and reach test and Active knee extension test for group CR is 18.34 ± 0.469 and 31.67 ± 5.667 respectively while the mean value and standard deviation of V sit and reach test and Active knee extension test for group HR is 16.267 ± 0.2876 and 39.93 ± 3.09 respectively. There is a significant difference in hamstring flexibility following both techniques ($p<0.0001$). From the results obtained, it is concluded that there is a significant enhancement in hamstring flexibility following both contract relax and hold relax technique in hamstring muscle. Further comparison concludes that contract relax technique is better.

LIST OF ABBREVIATION:

VSRT	**V SIT AND REACH TEST**
AKET	**ACTIVE KNEE EXTENSION TEST**
PNF	**PROPRIOCEPTION NEUROMUSCULAR FACILITATION**
GROUP CR	**GROUP CONTROL RELAX**
GROUP HR	**GROUP HOLD RELAX**

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CONFLICT OF INTEREST: None.

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