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EFFECTIVENESS OF PNF STRETCHING VERSUS STATIC STRETCHING IN HEALTHY INDIVIDUALS WITH HIP ADDUCTOR TIGHTNESS: A RANDOMIZED CLINICAL TRIAL.

Physiotherapy

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ABSTRACT

CONTEXT: There is hip adductor tightness can be a secondary complication due to underlying pathology as seen in disorders of central nervous system resulting in spasticity which include stroke, cerebral palsy, multiple sclerosis. The strength and low flexibility of hip muscles is also being reviewed as a cause for low back pain. adductor tightness has been associated with patellofemoral pain syndrome.
AIM: To find out effectiveness of PNF Stretching Technique or Static Stretching Technique on Hip Adductor Tightness.
SETTING AND DESIGN: The study was carried out in physiotherapy clinic at Vadodara.
METHOD AND MATERIAL: 40 subjects were included in the basis of inclusion criteria and divided into 2 groups with 20 participants in each group. One group received PNF Stretching Technique and other group received Static Stretching Technique. Subjects attended a baseline session, followed by 5 days intervention, and reassessment on the 5th day post intervention. Outcome measures used were hip abduction range of motion using Goniometer, single leg hop test and 8 direction star excursion balance test for dynamic postural stability.
RESULT: Both the groups showed significant improvements in hip abduction range of motion and SEBT. When compared, The PNF Stretching group showed marginally better results than static stretching. The results also showed significant pre – post differences within the respective groups.
CONCLUSION: The above study concluded that both the technique showed marked improvement in the outcome measure, but the PNF Stretching Technique are more effective for hip adductor tightness and it is easy to perform for the participants.

KEYWORDS

Hip Adductor Tightness, PNF Stretching, Static Stretching, Goniometer, SEBT

INTRODUCTION

Tightness is defined as adaptive shortening or lengthening of a muscle and its connective tissue which is a slow, nonpathologic process occurring in response to the range of motion being utilized in the related joints. With shortening the connective tissue elements of a muscle are in a continuously shortened state and the muscle has increased reactivity to both central and peripheral stimuli.[1] Tightness of hip adductors is relatively common and may result from adaptive changes in muscles that are not routinely stretched.[2]

Causes of adductor tightness can be a secondary complication due to underlying pathology as seen in disorders of central nervous system resulting in spasticity which include cerebro-vascular accidents (strokes), cerebral palsy, multiple sclerosis, in individuals advised bed rest and who do not receive active or passive exercise.[2] Other factors include sedentary lifestyle, postural malalignment, and muscle imbalances etc.[3]

In an ambulatory individual, extreme tightness of the adductors of the hip can create significant problems in gait, leading to Scissors gait. During swing, the limb with the tightness may have difficulty passing the stance limb, causing the individual to trip over the stance limb.[2] Hip adductor tightness has been associated with patellar maltracking leading to patellofemoral pain syndrome.[4]

Stretching involves the application of manual or mechanical force to elongate or lengthen structures that have adaptively shortened and are hypomobile.[5] Three methods of stretching to develop flexibility have emerged: ballistic stretching, static stretching, and PNF techniques. Static stretching has become the most widely used method for increasing ROM because of the simplicity of execution and lower potential for tissue trauma.[6]

PNF stretching, or proprioceptive neuromuscular facilitation stretching, are stretching techniques commonly used in clinical environments to enhance both active and passive range of motion with the ultimate goal being to optimize motor performance and rehabilitation.[7]

Static stretching is a commonly used method of stretching in which soft tissues are elongated just past the point of tissue resistance and then held in the lengthened position with a sustained stretch force over a period of time. The duration of static stretch is based on the patient's tolerance and response during the stretching procedure.[3]

AIM OF STUDY

The aim of the study is to compare the two techniques, PNF stretching and static stretching in the effectiveness of hip adductor tightness.

OBJECTIVE

To find out the technique more effective in hip adductors tightness.

Compare two techniques, PNF stretching versus static stretching for effectiveness in hip adductors tightness.

HYPOTHESIS

NULL HYPOTHESIS

There is no significant difference between the effect of PNF stretching and static stretching on hip adductor tightness.

ALTERNATE HYPOTHEIS

There is a significant difference between the effect of PNF stretching and static stretching on hip adductor tightness.

MATERIAL AND METHODOLOGY

STUDY SETTING: Physiotherapy clinic, Vadodara
SOURCE OF DATA: Vadodara
STUDY POPULATION: subject with hip adductor tightness and healthy individuals
SAMPLE SIZE: 40 hip adductor tightness
SAMPLING METHOD: Convenient sampling
STUDY DESIGN: A comparative study

INCLUSION CRITERIA

- Age – 15 to 25
- Gender – both males and females
- Willingness of the subject to participate in the study
- Bilateral hip adductors tightness.
- Hip joint abduction < 35` Unilateral

EXCLUSIVE CRITERIA

- Any hip joint pathology

- Hypermobility of hip joint
- LLD (Leg Length discrepancy)
- History of low back pain in the past six months
- LMN/UMN lesion

MEASUREMENT PROCEDURE

- The study was ethically approved by SHRI USB COLLEGE OF PHYSIOTHERAPY.
- Before starting the study consent was taken from the patient. The patients have been selected on the basis of inclusion and exclusion criteria.
- Anthropological and other data were collected (height, weight)
- 40 participants were divided into 2 groups randomly.
- **Group A**- was received PNF stretching. The subject was positioned in supine on the treatment table. The non-treatment leg rested outside the table with knee positioned at 90 degrees. The treatment leg was passively stretched for 10 seconds, then a 10-second active muscle contraction against resistance imposed by the evaluator at the inner thigh region was performed, and finally the hip muscles were extended by the evaluator for another 10 seconds. 4 sets were performed, also separated by 30-second intervals.
- **Group B**-was received Static stretching. The subject was positioned in supine on the treatment table. The non-treatment leg rested outside the table with positioned at 90 degrees. The treatment leg was passively stretched for 30 seconds hold, for 4 sets of 2 repetitions with 30 seconds interval between the repetitions.[10]

The outcome measures used in this study were Hip Abduction Range of Motion using Universal Goniometer for flexibility; SEBT for dynamic stability. The values were assessed for the dominant and the non-dominant leg. Pre-intervention values of all the outcome measures in the subjects were noted prior to the beginning of the study on Day 1. This was followed by intervention for 5 consecutive days. The post intervention measures were taken on Day 5 and the values were compared.

STATISTICALANALYSIS

The statistical analysis was done using the SPSS Version 16 software. $p<0.05$ was considered significant, paired t-test value, SD and mean of the data were analyzed and compared.

After screening 50 subjects for hip adductor tightness, 40 subjects who met the inclusion and exclusion criteria were taken for the study and were randomly allocated to either Group A (PNF stretching) or Group B (Static stretching). Group A had 13 males and 7 females and Group B had 9 males and 11 females.

RESULTS

Table 1: Comparison of two groups (Group A and Group B) with respected to age, height, weight, and BMI scores.

Variable	Group A		Group B		t-value	p-value
	MEAN	SD	MEAN	SD		
Age	20.1	2.55	21.05	2.32	0.5217	0.6078
Height	178.9	8.70	179.5	9.90	0.2549	0.8015
Weight	69.9	7.510	70	7.384	0.1537	0.8794
BMI	21.85	1.460	21.78	1.706	-0.1209	0.9050

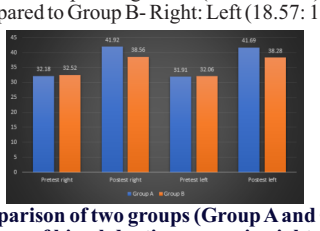
INTERPRETATION:

The table 1 shows that the comparison of two groups with age, height, weight and BMI scores.

OUTCOME MEASURE ANALYSIS

- **Hip Abduction ROM**

There was a significant difference in the pre- and post-test values of hip abduction range of motion for the right and left leg in both the groups. The % of change in Group A- Right: left (30.26: 30.64) % was more in both legs as compared to Group B- Right: Left (18.57: 19.40) %.



(Graph 1) Comparison of two groups (Group A and Group B) with respected to range of hip abduction scores in right and left side at pre and post test

(Table 2) Comparison of two groups (Group A and Group B) with Pretest and Posttest values are both sides in Hip Abduction ROM.

HIP ABDUCTION ROM							
		Group A		Group B			
		MEAN	SD	MEAN	SD	t-value	p-value
Right side	Pretest	32.18	2.04	32.52	2.14	0.5492	0.5892
	Postest	41.92	1.32	38.56	1.96	-7.2073	0.0001
Left Side	Pretest	31.91	2.02	32.06	1.64	0.2862	0.7778
	Postest	41.69	1.33	38.28	1.98	-7.3295	0.0001

STAR EXCURSION BALANCE TEST (SEBT)

There was a significant difference in the pre- and post-test values of right and left ranges in the star excursion balance test in both the groups. In anteromedial, medial, posteromedial, posterior, and posterolateral groups there was a significant difference in Group A and Group B.

In anterolateral group there was a significant difference in the right side in Group A and left in Group B.

In anterior group there was a significant difference in the percent of change in right and in Group A and left in Group B.

DISCUSSION

In present study, When the values of pre-treatment and post-treatment PNF stretching and Static stretching were analysed. It was statistically significant in PNF stretching technique and when comparison done between the groups, from both the techniques PNF stretching technique was proved statically more significant.

According to the available literature there is dearth of evidence that states the effectiveness of PNF stretching for hip adductor tightness for subacute duration and comparing these effects with conventional stretching protocols.

According to Sady et al. compared the effect of static and PNF stretching technique for hamstring muscles on the flexibility. A Leighton flexometer was used to measure ROM at the joint traversed by the tested muscle group. Only the PNF group had an increase in flexibility greater than the control group.[8]

According to Bradley PS et al. study the effectiveness of static, light ballistic, PNF stretching on strength performance. PNF stretching enhances the strength performance while other form of stretching does not because PNF stretching encourage the muscle inhibition.[9]

FURTHER RECOMMENDATIONS

- Treatment can be given for longer duration with follow up.
- Further studies can be done with larger sample size.
- Further studies can be done on different occupational group.

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