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Comparative study of the immediate effect of muscle energy technique and active dynamic stretching on hamstring flexibility in healthy females adults of age

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ABSTRACT

Flexibility is an integral part of optimal musculoskeletal characteristics. The tightness of hamstring muscles is one of the main factors hindering performance in daily activities. Reduction in the flexibility of the hamstrings has been reported to increase the risk of damage to the musculoskeletal system. The flexibility of the hamstring is important for general health and physical fitness. The hamstring muscle is found to be the most prevalent for the tightness in the body. The tightness of these muscles produces decrease range of motion and reduced flexibility of the pelvis, hip, and knee joints. Reduced hamstring muscle flexibility has been implicated in lumbar spine dysfunction and showing a strong positive correlation between decreased hamstring flexibility and low back pain. Hamstring flexibility plays an important role in lower extremity injury. A hamstring is a group of muscles including semitendinosus, semimembranosus, biceps femoris, and its functions as a flexor of knee and joint extensor of the hip joint.

Keywords: *Dynamic Stretching, Flexibility, Muscle Energy Technique.*

1. INTRODUCTION

Flexibility is an integral part of optimal musculoskeletal characteristics[1]. The tightness of hamstring muscles is one of the main factors hindering performance in daily activities. Reduction in the flexibility of the hamstrings has been reported to increase the risk of damage to the musculoskeletal system[2,3] . Flexibility of the hamstring is important for general health and physical fitness [4,5].The hamstring muscle are found to be the most prevalent for the tightness in the body. Tightness of these muscles produces decrease range of motion and reduced flexibility of the pelvis , hip, and knee joints[6].Reduced hamstring muscle flexibility has been implicated in lumbar spine dysfunction and showing strong positive correlation between decreased hamstring flexibility and low back pain[7]. Hamstring flexibility plays animportant role inlower extremity injury. Hamstring is a group of muscles including semitendinosus , semimembranosus , biceps femoris and its functions as flexor of knee and joint extensor of hip joint. Techniques are used for hamstring flexibility include static stretching exercise, heat, and proprioceptive neuromuscular facilitation (PNF)[8].Stretching exercise are commonly recommended for the prevention of lower extremity injury. Stretching technique are used in clinical practice, including ballistic stretching , static stretching, and proprioceptive neuromuscular facilitation techniques.There are many successful ways of treating hamstring tightness like mechanical , thermal , ice , stretch , any spray , ultrasound , soft tissue massage, short wave diathermy , myofascial release , and muscle energy technique.

2. NEED FOR STUDY

It is important to determine which method is most effective in clinical settings that would help the physical therapist to choose the most effective hamstring stretching technique to improve general mobility of an individual and to prevent hamstring strain injuries . Dynamic stretching is clinically used techniquefor hamstring stretching which stretches hamstring.

3. AIM AND OBJECTIVES

Comparative study of immediate effect of Muscle Energy Technique and Active Dynamic stretching on hamstring flexibility in healthy females adults of age group 15 to 30 years.

4. MATERIAL AND METHODOLOGY

STUDY DESIGN : An experimental study.

SAMPLE SIZE : 30 females (15 to 30 years of age).

SAMPLING METHOD : Simple random sampling.

STUDY SETTING : Physiotherapy departmentat care hospital.

STUDY DURATION : 6 months

INCLUSION CRITERIA

- Female of age group (15 to 30 years)
- Individuals with bilateral hamstring tightness of 20 degree or more.

EXCLUSION CRITERIA

- Any lower extremity/ low back pathology.
- History any recent lower limb fracture or surgery.
- Hypermobility of knee joint.
- Any neurological disorder.
- History of hamstring tear.

MATERIAL USED

- Plinth/ couch
- Universal half circle metal goniometer
- Stabilizing Belt
- Sketch pen
- Stop watch

OUTCOME MEASURE

- The active knee extension test was used to measure the hamstring flexibility in both groups.
- Group A treated with MET.
- Group B treated with DYNAMIC STRETCHING.

METHODOLOGY

This study was a pretest- posttest randomized controlled experimental design. Subjects were randomly assigned by drawing lots into two equal groups, muscle energy technique group (n-15) and dynamic stretching group (n-15).The treatment was given as one treatment session in a day.

PROCEDURE

The active knee extension test was used to measure hamstring flexibility. The subject was requested to lie in supine position with the non-tested limb and the pelvis was strapped to the plinth for stabilization. A full circle universal goniometer was used to measure the angle of knee ROM. The fulcrum of the goniometer was centered over the lateral condyle of the femur with fixed arm secured along the femur using the greater trochanter as a reference. The movable arm was assigned with aligned with the lower leg using the lateral malleolus as a reference. Subject was asked to actively extend the tested knee as far as possible until a mild stretch sensation was felt. The procedure was repeated 3 times and the average was taken for analysis.

Dynamic stretching group

Subject in this group was instructed to actively swing the leg to be stretch forward into hip flexion until a stretch was felt in the posterior thigh whilst keeping their knee extension and their plantar flexed. The leg was then allowed to swing back into slight hip extension. This was repeated for 30 seconds such that the dynamic stretch consisted of repeated hip flexion/extension.

Muscle energy technique was applied using post isometric relaxation. While the subject was lying in supine position, the subject's hip was passively flexed and the leg extended until tension was sensed. The subject provided a moderate knee flexion isometric contraction (approximately 50% of maximal contraction) by pressing ankle joint against the top of therapist's shoulder for 7-10s.This

was followed by 2-3s of relaxation and then the leg was passively stretched by the therapist to the palpated barrier to stretch and held for 30sec.The leg was then lowered to the table for a short resting period (approx 10 sec).This procedure was repeated two more times.

DATA ANALYSIS

The data were statistically analysed using graph pad instat 3.0 software. Statistical test used in the present study was unpaired T-test, to compare active dynamic hamstring stretching and Muscle energy technique on hamstring flexibility both. Level of significance used-$p<0.05$.

OBSERVATION

Mean and standard deviation of pre stretch and post stretch knee extension range of motion after active dynamic stretching in females

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ACTIVE DYNAMIC STRETCHING		
	Pre-stretch	Post-stretch
Mean	25.43	15.2
S.D.	3.78	3.61

Mean and standard deviation of pre stretch knee extension range of motion after Muscle energy technique in females.

After Muscle energy Technique.		
	Pre-stretch	Post-stretch
Mean	26.56	15.23
S.D.	4.32	3.92

RESULTS

The means and standard deviations(S.D)of pre stretch and post stretch knee extension range of motion(ROM) after active dynamic hamstring stretching in females shown in Table-1.In females pre stretch knee extension ROM was 25.43 ± 3.78 degreesand mean post stretch knee extension ROM was 15.2 ± 3.61 degrees.

The means and standard deviations(S.D)of pre stretch and post stretch knee extension range of motion(ROM) after muscle energy technique in females shown in Table no.2 The mean pre-stretchof muscle energy technique knee extension ROM was 26.56 ± 4.32 and mean of post stretch knee extension ROM was 15.23 ± 3.92 degrees with p=0.001

The mean and standard deviation (S.D) of difference change in dynamic stretching technique and muscle energy technique is shown in table no 3.The mean and standard deviation of active dynamic stretching was 10.23 ±4.56 and mean of muscle energy technique was 11.33 ± 3.47 degrees with p=0.001.

5. DISCUSSION

This study compared the immediate effects of Muscle energy technique and active dynamic stretching technique for increasing knee ROM of subjects with bilateral hamstring tightness and the result shows that there is significant improvement in hamstring length by giving Muscle energy Technique[16].

The passive stretching group showed a significant improvement in flexibility compared with the active stretching group. Winter et al. reported that muscle energy technique is characterizes by the external addition of stretch stimulation on muscle contraction, while active stretching is characterized by a reciprocal innervation mechanism used to relax antagonist muscle contraction[17.]The improvement in hold relax technique may be attributed to the fact that tension in the muscle relaxation of the tight muscle. There is also passive elongation of muscle and fascia as the joint moves in the opposite direction after the muscle relaxes from maximal isometric contraction. And this is quite consistent with the findings proposed by Nagarwal et.al (2010). The mechanism for this gain in flexibility could also be the change in stretch perception or tolerance as has been proposed by sharman MJ et.al in(2006)[18.]

Hutton proposed that during PNF stretching it is likely that pre stretch conditioning contraction loosens the thixotropic bonds decreasing muscle stiffness via manipulation of the myogenic component rather than neurogenic component[19.]

6. CONCLUSION

It can be concluded that both muscle energy technique and active dynamic stretching will improve hamstring flexibility. Muscle Energy technique resulted in significant improvement as compare to dynamic stretching on hamstring flexibility.

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