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Comparative Study of the Effectiveness of Muscle Energy Technique and Hold Relax Technique to Improve the Hamstring Flexibility in Patients with Lower Back Ache

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Abstract: ***Background: Flexibility is considered as a perquisite for normal mobility and function as its inflexibility has been related with development of soft tissue and musculoskeletal injuries. Muscle Energy Technique (MET) is a manual technique which is used for a variety of purposes including lengthening a shortened or contracted muscle, strengthening muscles. Stretching techniques are used to increase flexibility which is important in prevention of injury, muscular imbalance and maintenance of full range of joint movement and enhanced performance in day to day activities. PNF stretching is one technique which is more efficient treatment for flexibility enhancement. Aim: The Aim of the study is to investigate and compare the effectiveness of Muscle energy technique [MET] and Hold Relax Technique [PNF] to improve the hamstring flexibility in patients with LBA. Material and Methodology: The study design is a comparative study.30 healthy participants with LBA who have hamstring tightness were selected based on inclusion and exclusion criteria and randomized into 2 groups. Group A were given Muscle Energy Technique (MET) and Group B were given Hold Relax Stretching. The study duration was 3 weeks, 4 days per week. All subjects underwent a pre and post intervention measurements of Active Knee Extension test and Sit and Reach test. Result: Pre and Post test were statistically analysed and it was found that there is significantly (P<0.001) better improvement in Group A (Muscle Energy Technique) than Group B (PNF Hold Relax Technique). Conclusion: MET are effective in improving reported pain, disability and joint range of motion in both asymptomatic subjects and symptomatic subjects Muscle Energy technique is more effective in improving hamstring flexibility than the Hold Relax Technique (PNF) in patients with LBA.***

Keywords: LBA, hamstring flexibility, Muscle energy technique, hold relax technique, Active Knee Extension test, Sit and Reach test.

1. Introduction

Back pain is one of the most common patient complaints brought forth to physicians. Mechanical back pain accounts for 97% of cases, arising from spinal structures such as bone, ligaments, discs, joints, nerves, and meninges. Common causes of mechanical back pain include spinal stenosis, herniated discs, zygapophysial joint pain, discogenic pain, vertebral fractures, sacroiliac joint pain, and myofascial pain. The point prevalence of back pain is 7 - 14%, one year prevalence is 36 - 37% and life time prevalence is 58%. Back pain frequently occurs between 19 - 26. It is equally prevalent in both genders. But females are more prevalent. Consequently physiotherapists have faced challenges for centuries in finding prevention strategies to reduce the burden of chronic low back pain. Thus, we believe that, in order to reduce the increasing prevalence of low back pain, it is of paramount importance to identify the risk factors and co - morbidities from the formative stage, namely early childhood and control them rather than focusing on policies and treatments only during adult life. The educational approach must be initiated in the formative stages of development with an understanding of the anatomy of the spine, pathophysiology of pain, biomechanics, fear avoidance and perceptions of well being.

This study investigates and compares the effectiveness of Muscle energy technique [MET] and Hold Relax Technique [PNF] to improve the hamstring flexibility in patients with LBA. Though other treatments provide significant effect on improving the flexibility and pain but a new approach to improve the efficacy of flexibility through MET and PNF Technique is initiated through this.

2. Methodology

Sources of Data: Primary data will be collected from the samples. The samples will be included for the study based on purposeful randomized sampling method. Subjects are taken from Tagore Medical College and Hospital and Physiotherapy outpatient department.

Study Design: *Comparative study (pre / post)*

Study Setting: *Tagore Medical College and Hospital, Tagore college of Physiotherapy, Rathinamangalam.*

Study Type: *Experimental study*

Study Size: (n=30) - Group A = 15 subjects. This consists of 15 subjects those who were receiving METs. Group B = 15

subjects. This consists of 15 subjects those who were receiving Hold Relax Technique.

Study Duration: 3 weeks

Inclusion Criteria: male and female, 20 to 40 years, Patients with hamstring tightness, History of fracture and surgery, Patient with disc herniation, Patient with osteoarthritis, Patient with spondylolisthesis.

Exclusion Criteria: diabetes, hypertension, malignancy, psychiatric disorders, etc.

3. Procedure

30 healthy participants who fulfill the inclusion criteria were included in the study. All the subjects were explained about the procedure to be done to gain their cooperation and confidence. Written informed consent was obtained from all the subjects before participating in the study. The main objective of the study is to improve the hamstring flexibility in patients with LBA using Muscle energy technique and Hold relax technique. Muscle Energy Techniques (MET) are a form of soft - tissue or joint, manipulations or mobilizations, deriving from osteopathic medicine, employed in the treatment of musculoskeletal dysfunction.

After finding their suitability as per the inclusion and exclusion criteria, they were requested to participate in the study. Those willing to participate were briefed about the nature of study and intervention. Only those willing to take intervention were included in the study. Their demographic data was collected along with their initial assessment of VAS score, range of motion of the lumbar spine AKE test and sit and reach test. Visual analogue scale (VAS) was used to assess pain through a line of 10 cm divided from 0 to 10, where 0 refers to no pain and 10 refers to the worst pain. Materials used were a universal goniometer, sit and reach test box, couch, consent form, pen and data sheet. Pre intervention and post intervention evaluation immediately following the stretch was taken with sit and reach test and Ankle knee extension test to measure hamstring muscle flexibility. Both tests were performed three times and the average of the three measurements was used for data analysis.

The 30 participants were randomly allocated to two groups of 15 – Group A (n=15) and Group B (n=15). Subjects assigned to Group A were given Muscle Energy Technique (MET) and group B given Hold Relax Stretching. Both groups were given treatment for 12 sessions in total of 3 weeks (i. e., 4 days per week).

Outcome measures

All subjects were evaluated before and immediately after applying stretch using following outcome measures:

Sit and reach test (SRT)

SRT, which assesses the flexibility of the posterior muscular chain, is performed with subjects instructed to sit with the hip joints at 90º angle, knees extended and feet against the sit and reach box. Subject was asked to place hand over hand and to perform a hip flexion and to reach as far as possible without bending his knees.

Active Knee Extension Test (AKE)

Subjects were assessed for hamstring tightness using the AKE test1, 33 (figure 1). The subject was in supine position with hips in 90 degree flexed and knee flexed. A PVC cross bar was used to maintain the proper position of hip and thigh. The testing was done on the right lower extremity and subsequently the left lower extremity and the pelvis were strapped down the table to stable the pelvis and control any accessory movements. Landmarks used to measure hip and knee range of motion were greater trochanter, lateral condyle of femur and the lateral malleolus which were marked by a skin permanent marker. The fulcrum of the goniometer was centered over the lateral condyle of the femur with the proximal arm secured along the femur using greater trochanter as a reference. The distal arm was aligned with the lower leg using the lateral malleolus as a reference. The hip and knee of the extremity being tested was placed into 90 degree flexion with the anterior aspect thigh in contact with the horizontal bar of the PVC frame at all times to maintain hip in 90 degrees of flexion. The subject was then asked to extend the right lower extremity as far as possible until a mild stretch sensation was felt. A full circle goniometer was then used to measure the angle of knee flexion. Three repetitions were performed and an average of the three was taken as the final reading for knee flexion range of motion (hamstring tightness).

4. Data Analysis

Table 1: The mean, median SD, t and p value of the Pre and Post test of AKE and for Group A

Group A

AKE	Mean	SD	Median	P - Value	T Value
Pre - test	81.00	13.26	80	<0.05	11.8772
Post - test	109.67	15.06	110		

Table 2: The mean, median SD, t and p value of the Pre and Post test of AKE and for Group B

Group B

AKE	Mean	SD	Median	P - Value	T Value
Pre - test	83.67	18.17	80	<0.0001	7.4075
Post - test	92.67	19.54	90		

Table 3: The mean, median, SD, t and p value of the Pre and Post test of SIT AND REACH TEST and for Group A.

Group A

SIT and Reach Test Group A	Mean	SD	Median	P - Value	T Value
Pre - test	15.00	2.83	15	<0.05	19.3649
Post - test	10.00	2.78	11		

Table 4: The mean, median SD, t and p value of the Pre and Post test of SIT AND REACH TEST and for Group B.

Group B

SIT and Reach Test Group B	Mean	SD	Median	P - Value	T Value
Pre - test	14.27	2.05	15	<0.05	11.50
Post - test	12.73	1.94	11		

Table 5: The mean, median, SD, t and p value of the post - test AKE TEST for both group A and B.

AKE Test for Group A and B

AKE Test	Mean	SD	Median	P - Value	T - Value
Post - test Group A	109.67	15.06	120	<0.05	2.6695
Post - test Group B	92.67	19.54	90		

Table 6: The mean, median, SD, t and p value of the post - test SIT AND REACH TEST for both group A and B.

SIT and Reach Post Test - Group A and B

SIT and Reach Test	Mean	SD	Median	P - Value	T - Value
Post - test Group A	10.00	2.78	11	<0.05	3.1223
Post - test Group B	12.73	1.94	13		

5. Result

The study sample comprised of 30 healthy participants. Among 30 individuals, 15 subjects were treated with Muscle Energy Technique (MET) and 15 subjects were treated with Hold Relax Technique (PNF). Paired t – test was used to compare both Active knee extension test and Sit and Reach test before and after the intervention. This test has showed in improving the hamstring flexibility in both groups ($p<0.05$).

6. Conclusion

Stretching is a simple and effective activity which will help you to enhance your athletic performance decrease your likelihood of sports injury and decreasing muscle soreness. From the results obtained it is concluded that there is very highly significant enhancement in hamstring flexibility following both MET and Hold relax technique in hamstring muscle. Further comparison the post treatment effect of both MET and Hold relax concludes that MET is better. However, it is commented that with their small sample size it is difficult to standardize the result. Hence further study on larger samples over longer duration is recommended.

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