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Original Research Paper

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# AN IMMEDIATE EFFECT OF BILATERAL SELF MYO-FASCIAL RELEASE ON PLANTER SURFACE OF FOOT IN SCHOOL GOING CHILDRENS WITH HAMSTRING TIGHTNESS: AN EXPERIMENTAL STUDY.

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## ABSTRACT

**CONTEXT :** Flexibility is the ability to move a single or series of joints smoothly and easily through an unrestricted, pain-free range of motion. Decreased hamstring flexibility is considered to be a predisposing factor for lower back pain and injury. The purpose of the study was to see the immediate effect of a single session of self-myofascial release on plantar aspect of foot, on hamstring.

Aim: To find out an immediate effect of Self Myofascial Release (SMR) Technique in school going children with hamstring tightness

**SETTINGS AND DESIGN:** The interventional study was carried out in various primary schools of Abu road.

**Method and material:** SMR technique was given to 30 subjects, aged 5-12years. Also, the inclusion and exclusion criteria were taken into consideration.

**RESULTS:** Statistically there is significant ($p<0.05$) effect of SMR technique in school going children with hamstring tightness.

**CONCLUSION:** There is significant effect of SMR technique in school going children with hamstring tightness. Therefore, SMR technique can be used with conventional techniques to improve hamstring flexibility in school going children.

**KEYWORDS :** Self Myofascial Release (smr) Technique, Active Knee Extension (AKE), Hamstring Tightness.

## INTRODUCTION

Muscle is a contractile tissue which brings about movements. Muscle can be regarded as motors of the body.[1]

The hamstrings comprise three large muscles, namely semi-tendinous, semi-membranous and biceps femoris which originate from the infero-medial impression on the upper part of the Ischial tuberosity and gets inserted on the upperparts of posterior surface of tibia. They are located in the posterior compartment of the thigh and acts on the hip and knee joint. Hence, they are extensors of the hip and flexors of the knee.[2]

Flexibility is a vital component of fitness required for most desirable musculoskeletal functioning and maximizing the performance of physical activities. Flexibility dysfunction is a wide spread problem faced by common as well as sports persons, especially in case of hamstring group of muscles. Reduced flexibility generates a vicious cycle of range reduction and resulting increase in postural problems.[3]

Muscle tightness is caused by decrease in the ability of the muscle to deform, resulting in a decrease in the range of motion at the joint on which it acts.[2]

Inability to extend the knee completely when the hip is flexed accompanied by discomfort or pain along the posterior thigh and/or knee is usually attributed to hamstring muscle tightness. Clinically, hamstring muscle length is not measured directly but instead, it is represented indirectly by angular measurements of unilateral hip flexion with the knee extended. Hamstring muscle tightness is defined as Knee Extension Angle (KEA) greater than 20 degrees where KEA is the degree of knee flexion from terminal knee extension.[2]

The main reason of muscular tightness is a reduction in ability of muscle to deform, leading to a lower range available at concerned joint for motion. Tight hamstrings are associated with a dysfunctional motor control pattern leading to a submaximal firing pattern of postural muscles resulting in function of hamstrings as stabilizers rather than their main function of prime movers. This change in primary function leads to the presentation of hamstring tightness.[3]

Myofascial release is one of the commonly utilized manual techniques to facilitate the stretching of corresponding tissue continuously or enhance the extensibility of soft tissue through compression while rest during restricted fascia or normal muscular length. MFR is generally to apply slow and continued pressure to restricted fascial layer for 120 to 300 seconds. Self-MFR is a type of MFR implemented by each individual using a tool instead of therapist. Self-MFR is an affordable and easily available method to help patients ease their muscular and fascia pain and maintain flexibility. Self-MFR increase flexibility, reduced delayed onset muscle soreness, adjusts arterial function and hemangio endothelial function, and adjust autonomic nervous system on the continuous basis.[4]

## GONIOMETER

To measure a ROM of a particular joint, the therapist should have thorough knowledge on the ROM of an individual joint. Selection of goniometer is a important factor while measuring ROM of joint. The universal goniometer is designed by Mr.Moore. This is the commonest variety having stationary arm, movable arm and body.[5]

## ACTIVE KNEE EXTENSION TEST

For the AKET participants were positioned supine on a plinth so that the leg not being tested was flat on the plinth with the knee extended. A strap was placed over the mid-thigh of this leg to eliminate any elevation of the limb. An additional strap was positioned over the front of the participant's pelvis and around the plinth to maintain the pelvis in a neutral position during hamstring measurements. Subject then flexed his hip to 90 degree and subject was instructed to grasp behind the knee with both the hands to stabilize the hip. subject then actively extends the knee as far as possible.[6]

## AIM OF THE STUDY:

The aim of the study was to find out an immediate effect of self myofascial release technique in school going children with hamstring tightness .

**OBJECTIVE OF THE STUDY:**

- To assess the hamstring tightness in school going children
- To assess the improvement in hamstring tightness in school going children post SMR technique.
- To assess the difference between pre and post ROM after application of SMR technique.

**HYPOTHESIS**

- **EXPERIMENTAL HYPOTHESIS :** Self myofascial technique is an effective technique in reducing hamstring tightness in school going children.
- **NULL HYPOTHESIS:** Self myo fascial release technique is not an effective technique in reducing hamstring tightness in school going children.

**MATERIAL AND METHODOLOGY:**

**STUDY SETTINGS:** Shri U.S.B. college of physiotherapy, Abu road .

**SOURCE OF DATA:** Various primary schools in Abu road(RAJASTHAN) .

**METHOD OF DATA COLLECTION:**

**STUDY POPULATION:** school going children with hamstring tightness

**SAMPLE SIZE:** 30 Students

**SAMPLING METHOD:** Purposive sampling

**STUDY DESIGN:** An experimental study

**MATERIAL:**

- Plinth
- Foam mattress
- Goniometer
- Inch tap
- tennis ball
- Straps
- Weighing machine
- Stop watch
- Consent form
- Assessment form
- Pen and paper

**CRITERIA FOR SELECTION**

**INCLUSION CRITERIA:**

- AGE: 5-12 years children
- GENDER: Both ( male and female)
- Normal child.
- Bilateral Hamstring tightness (minimum degree $\leq 160°$)

**EXCLUSION CRITERIA:**

- Regular sports player
- hamstring tear
- Past pathology
- Post fracture of lower limb
- History of spinal cord injury
- History of low back pain
- Subject using lower limb prosthesis or orthotic device

**MEASUREMENT PROCEDURE**

After the approval of the study from the ethical committee, 30 subjects from various schools of Abu road, who fulfilled the inclusion and exclusion criteria where taken for the study purpose. Written informed consent was signed by the class teacher of each subject before proceeding for the study procedure. Before starting the study a brief assessment was taken. Class teachers and subjects were explained about the test and procedure to be conducted. Total 30 subjects with tight hamstrings were selected.

Before data collection procedure begun, each subject received a verbal explanation and a demonstration of the movement to be performed and practice trials were performed by them. For subjects to fit in inclusion criteria AKE test was performed whose minimum degree was taken as 160 degrees.

**APPLICATION OF SMR TECHNIQUE**

- Position of participant comfortable and relaxed sit on the chair.
- Participant sit on edge of chair, hand placed at two side's edge of chair.
- Participants were taught SMR by a researcher, using a predetermined script which is sufficient for the participant to complete the intervention competently and to reduce bias.
- Grab a tennis ball
- Place one foot on the ball.
- Participant was instructed to roll a tennis ball on the sole of each foot from behind the metatarsal heads to the heel concentrating on the medial arch for two minutes.
- Pushing into discomfort but not pain
- Participant were instructed to apply as much pressure as they could.
- As greater pressures have shown to have better benefits on flexibility.
- The total treatment part is four minute of self myofascial release.
- After treatment the researcher undertaking post AKE measurements.

**RESULTS**

All statistical analysis was done by SPSS statistics version 20.0 for windows software.

**TABLE AND GRAPH**

Total 30 subjects were taken. (n=30)

Table 5.1: Gender Distribution

| GENDER | FREQUENCY |
|---|---|
| MALE | 20 |
| FEMALE | 10 |
| TOTAL | 30 |

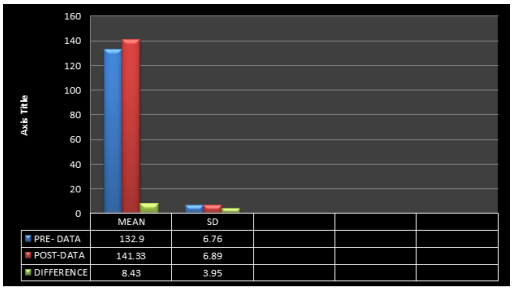
**Interpretation: Table 1 shows gender distribution.**

Paired T test was used for pre treatment and post treatment comparison of AKE values.

Table 2: Intra- group comparison of MEAN and SD of pre-data, post-data and difference, also mean and SD of age

| | MEAN | SD |
|---|---|---|
| AGE | 9.93 | 1.63 |
| PRE DATA | 132.9 | 6.76 |
| POST DATA | 141.33 | 6.89 |
| DIFFERENCE | 8.43 | 3.95 |

**Graph 1 : Intra-group comparison of mean and SD of pre-data, post-data and difference.**




**INTERPRETATION:**

The above table 2 and graph 1 shows the mean of pre SMR technique was 132.9, mean of post SMR technique was 141.33, mean difference is 8.43. Hence, the result of paired t test shows that there was significant difference between the pre and post AKE.

## DISCUSSION

The intent of the study was to find out an immediate effect of SMR technique in school going children with hamstring tightness. In the present study, the values of pre-treatment and post-treatment SMR technique was analyzed and it was proved statistically significant.

Hamstring tightness increases from early childhood and with advancing age other contributing factors like lack of physical activity, prolong sitting also plays an important role in decreased hamstring flexibility.

**1. Jihye jung et al,** conducted a study on immediate effect of self myo fascial release on hamstring flexibility and concluded that effect of self myofascial release on improving hamstring flexibility and relives **myo** fascial pain.

**2.Divya g patel et al, (2016)** conducted a study to find out an immediate effect of application of bilateral self myofascial on the plantar surface of the foot on hamstring and lumbar spine flexibility and concluded that a single session of SMR on bilateral plantar aspect of foot is effective in increasing hamstrings length, but there was no change in lumbar spine flexibility in young asymptomatic individuals.

## CLINICAL IMPLICATIONS

The results suggest that the self myo-fascial release technique is proved to be effective in improving the hamstring flexibility hence improving the range of motion of joint.

## LIMITATIONS

1. Subjects with 5- 12 years of age were considered for study thus results cannot be generalized to age group.
2. Only immediate effect was studied, short and long term effects was not studied that would have helped to find the maintenance of the improved outcome measures.
3. Only AKE ROM was measured.
4. Study was done only on normal subjects.

## FURTHER RECOMMENDATIONS

1. Treatment can be given for longer duration with follow up.
2. Further studies can be done with larger sample size.
3. This study can be done by taking different outcome measure.
4. Further study on other techniques in combination with Hold-Relax Proprioceptive Neuromuscular Facilitation and Foam Roller exercise.
5. Study can be done on only male or female participants.

**Conflict of Interest:** Nil.
**Source of Fund:** No fund was needed.
**Ethical Clearance:** From Shri USB College of Physiotherapy, Abu road.

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