



IMMEDIATE EFFECT OF SELF MYOFASCIAL RELEASE (FOAM ROLLER) VERSUS MANUAL MYOFASCIAL RELEASE ON HAMSTRING FLEXIBILITY IN IT PROFESSIONALS WORKING FROM HOME”.

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Abstract:

Introduction –The characteristic of a hamstring muscle to get tightened is much higher than other skeletal muscles. Physical inactive way of life causes bad body posture. That would be the reason so far that the long sitting hours seen in IT Professionals to get altered length of hamstring muscles. Cross hand release methods are by a far the main, major and normally utilized strategies in the MFR approach and structure the premise of each other MFR procedure. Instrument are right now being made and tried to be utilized to recreate myofascial release procedures so people can do their own helped fascial discharge at home without the guide of an advisor. One such device is foam roller.

Method -According to inclusion criteria 40 subjects from IT Company were selected. With the help of simple chit method of randomization all 40 subjects were divided into two different groups. Group A foam rolling, and Group B cross hands myofascial release technique.

Result - Result were statistically analyzed using paired and unpaired t-test by using SPSS version 20, there was significant improvement in ACTIVE KNEE EXTENSION TEST with $p < 0.05$ in group A and group B, but there was more significant improvement in ACTIVE KNEE EXTENSIVE TEST in group B rather than group A.

Conclusion - : For improvement in hamstring flexibility in college going students cross hands MFR was more effective treatment than foam rolling. On individual bases both treatments were improving sit and reach test score in college going students.

Index Terms – foam roller, cross hands myofascial release technique, hamstring flexibility, IT professionals, active knee extension..

I. INTRODUCTION

Working from Home is currently a global scenario. world population is opting to work from home culture from desk job workers, which might continue for a few years. ⁽¹⁾ Laptop Postures assumed at home have a vast variance from sitting on a chair with laptop on the lap to lying on the bed with laptop while working leading to changes in the kinetic and kinematics of the body. ^(1,2,3) Prolonged sitting and working with laptop are a contributory factor in hamstring muscle tightness. ⁽⁴⁾ It mostly affecting the posterior superficial back line leading to neck pain, low back pain, knee pain etc. Fascia becomes involved due to injury, disease, inactivity, inflammation, etc. Fascial involvement leads to restrictions in it that decreases soft tissue flexibility, strength, endurance, motor coordination and leading to high amounts of physical pain. ⁽⁵⁾ Joint integrity, muscle length and the extensibility of soft tissues around the joint determine its flexibility through unrestricted, pain free range of motion (ROM). ^(5,6) Flexibility has many benefits in fitness and in rehabilitative programs. It is one of the important parameters of muscle function which facilitates the neuro-musculoskeletal systems and is responsible for performance of complicated movements ^(5,6)

Hamstrings group of muscles is of posterior compartment of thigh and are responsible for flexion at the knee joint and extension at the hip joint. The hamstrings play a crucial role in daily activity like walking, running, jumping and controlling movements of the trunk. The most common causes of hamstring tightness include inadequate stretching before an intense workout, maintaining the same position for extended period of time for instance prolonged sitting, standing, kneeling etc. ⁽⁷⁾ Hamstring tightness though is asymptomatic, but it predisposes to problems like heel pain, knee pain and low back pain due to compensatory mechanism that controls excess lumbar lordosis. Even when it is asymptomatic, the tightness must be prevented to avoid further problems ⁽⁷⁾

Myofascial release (MFR) is a very wide terminology that includes variety of maneuvers in which includes application of pressure to muscles and surrounding fascia. Recently, MFR techniques have been more commonly used to help treat restrictions of soft tissues and improve their flexibility. Self-myofascial release (SMR), a type of myofascial release technique, allows regular and frequent application of intervention without the therapist's help with tools like foam roller, hard roller and other devices. ^(6,8,9) The individual uses his/her own body mass to exert pressure on the soft tissues as they roll over a harder surface to facilitate fascial release. ^(8,9,10) Immediate use of foam roller helps to reduce restrictive barriers or fibrous adhesion seen between layers of fascial tissues. It can be used to improve

core stability, balance and proprioception, soft tissue mobility and body awareness. Foam rollers can be used conveniently for almost all group of muscles like hamstrings, Quadriceps, Gluteal muscles, Iliotibial band, calves, and back, etc. ⁽⁸⁾

Muscle mass is separated from the neighboring tissues by a thick fibrous tissue layer known as fascia. In our body every muscle, bone, vessels, nerves etc. is covered by fascia, so indirectly fascia is responsible for muscle flexibility. In response to any trauma, fascia can act as a protective layer by restricting its flexibility. Because of this, it creates poor muscular biomechanics. Over the period of time, functional capacity of that muscle would be lost. Myofascial release was created by Mark F. Barnes in 1997 and is an involved soft tissue procedure that encourages the limited fascia. MFR has been one of the physiotherapy therapies given in the ongoing condition that causes tightness and limitation in soft tissues. By myofascial release there are adjustments in the consistency of the ground substance to a more liquid state which kills the fascia's extreme tension on the agony touchy structure and re-establishes proper alignment. Cross hand release methods are by a far the main, major and normally utilized strategies in the MFR approach and structure the premise of each other MFR procedure.

Foam roller is defined as the tool used as self-induced myo-facial release technique in which the individual uses the body weight on foam roller to exert pressure on soft tissue. ⁽¹¹⁾

Hamstring tightness is defined as the 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.

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 ⁽¹²⁾

II. METHODOLOGY

According to inclusion criteria from IT Company were selected before starting treatment I give them brief introduction about my study and their consent was taken, both verbally and written. With the help of simple chit method of randomization all 40 subjects were divided into two different groups. So subjects who get chit named A were allotted in group A and treated with the foam roller, those who get chit named B were treated with cross hands myofascial release technique. To confirm the effectiveness of both treatments ACTIVE KNEE EXTENSION score was measure before and after the myofascial release.

II.A INCLUSION CRITERIA

1. Adult individuals between the age group between 25 to 35 years of age who is having hamstring tightness.
2. Both male and female
3. Adult individuals working from home with sitting job more than 5hours ⁽²⁰⁾
4. .Individuals with hamstrings tightness (deficit in active knee extension test more than 20 degrees) ⁽²⁰⁾
5. Subjects willing to participate in the study.

II.B EXCLISION CRITERIA

1. History of fracture and soft tissue injuries in past 6 months
2. Surgical incisions or open wound on the lower limb ⁽²⁰⁾
3. Febrile state
4. Systemic or localized infections
5. Inflammation-Rheumatoid conditions
6. Hypersensitivity to skin
7. Individuals doing physical exercises (yoga, aerobic exercise, stretching etc) ⁽²⁰⁾

II.C OUTCOME MEASURES

.Active knee extension test (AKET)-

Reliability=0.87 ⁽²¹⁾



PROCEDURE

- Ethical committee clearance was taken.
- Subjects were assessed for inclusion and exclusion criteria
- Subjects fulfilling the inclusion criteria were included in the study
- 40 number of subjects were included for the study; With the help of simple chit method of randomization all subjects were divided into two different groups. So, subjects who get chit named

A were allotted in group A and treated with foam roller, those who get chit named B were treated with cross hands myofascial release technique.

- They were explained about the study in brief and will be given information verbally about how this study will benefit them.
- After the selection of the subjects, consent form will be given to them.
- A signed consent was collected from them and they will be screened measuring the Active knee extension test
- Pre-intervention and AKET will be assessed using goniometer for hamstring muscle and data will be recorded.
- The procedure of the study was explained to all participants in both groups.

GROUP A: FOAM ROLLING

- One introductory lecture was taken before the treatment session in which all the subjects will educate about what is foam roller and how to use it.
- Place the foam roller between their ischial tuberosity and floor with their legs extended, instructed them to keep their ankles relaxed.
- Subjects were then instructed to support their body weight with their arms extended but to allow as much pressure between the hamstring muscle group and the foam roller.
- Then actively move the foam roller at a cadence of 1second inferior (ischial tuberosity to popliteal fossa) and 1 second superior (popliteal fossa to ischial tuberosity).
- To prevent fatigue, allow subject to rest after every 1 min of repetitions for 30 seconds only.
- Total treatment duration is 5 min.
- Then the participants were made to sit on floor in long sitting position with one hip-knee in flexion and with the foam roller below the thigh to be treated.
- Then the participants were instructed to extend the upper limbs, taking weight on them and asked to roll back and forth over the roller for a period of 30sec followed by 30 seconds of rest for a period of 3 to 5 min⁽¹⁰⁾



GROUP B: MYOFASCIAL RELEASE TECHNIQUE (CROSS HAND RELEASE)

- During treatment subject were wearing comfortable clothes.
- Subject's privacy was maintained during treatment time.
- Position of subjects: -lie prone with the legs straight.
- Position of therapist: -stand at the side of the treatment table. Each stretch was maintained for 30 seconds. (10 repetitions /limb)
- Total treatment duration: - 5 min on each limb.
- Hand placement for cross hand myofascial release Technique: - One hand was placed skin on skin, on the posterior thigh close to the back of the knee with fingers pointing towards the ankle or wrapping around the thigh
- Other hand was just below the ischial tuberosity, where the hamstring muscles attach, with fingers pointing towards the head.
- Then applied stretch to the fascia.



III. STATISTICAL ANALYSIS

I.All the pre and post data was primarily analysed.

II.As this analysis shows that data of study follows normal distribution parametric test was used that is t test.

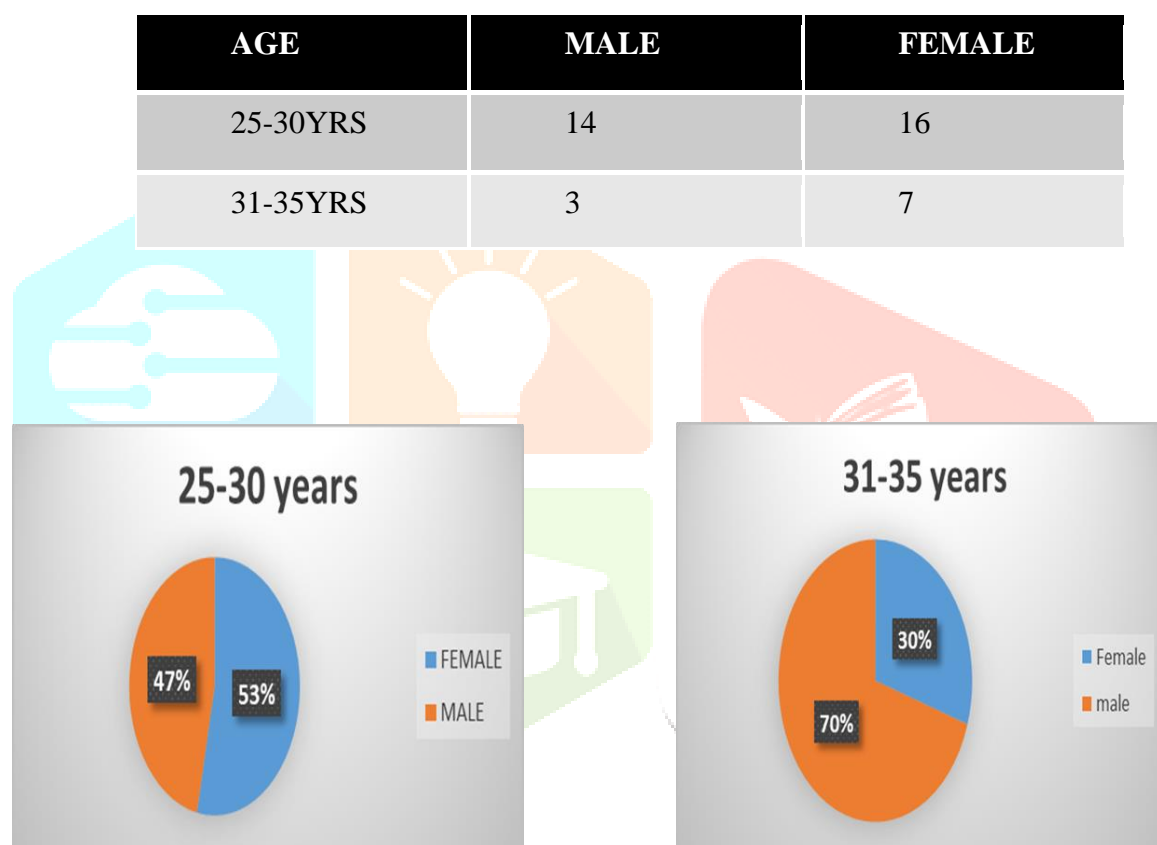
III.Statistically significant was set at $p \leq 0.5$

IV.Analysis was done within and between the groups by paired and unpaired t test.

V.To overcome all conflicts ,the demographic data like-age, gender distribution also check and compared.

IV. RESULTS

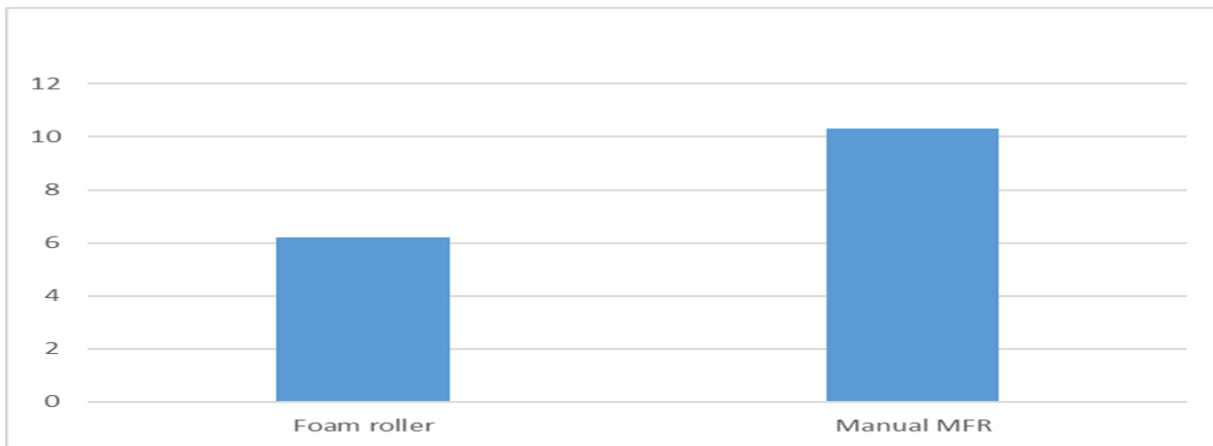
GRAPH 1 : AGE GROUP DISTRIBUTION:



INTERPRETATION: The graph shows that participants between the age group of 25-30 yrs are 14 Males; 16 Females and participants between group of 31-35 are 3 males; 7 females.

GRAPH 2: MEAN DIFFERENCE OF BOTH GROUP A & B.

	Mean Difference
Foam roller	6.2
Manual MFR	10.3



INTERPRETATION: The graph shows that there is significant mean difference in group A is 6.2 and group B is 10.3

V. DISCUSSION

This study was established to check the effectiveness of foam roller and cross hands myofascial release technique, and compare both the treatment for improving hamstring flexibility for those who having tightness. For this study 40 subjects were taken from IT Company in pcmc area, pune. Purposive sampling was done by simple chit method into 2 different groups, Group A (foam roller) and Group B (cross hands MFR). For Group A subjects one introductory session was arranged in which I teach them how to use high thickness foam roller. And standardized protocol was done for this study which helps to confirm the chronic effect of this treatment. For evaluation of hamstring tightness ACTIVE KNEE EXTENSION TEST was used. Its score was documented before and after the study.

According to this study results both the group had improve their Active knee extension score as both statistically shows p value < 0.001 so both the treatments were effective for improvement in hamstring flexibility. As per my knowledge this is first study which is going to treat hamstring tightness with cross hand myofascial release technique as other articles used different technique of myofascial release. While doing comparison of this two treatments, subjects who were treated in Group B with cross hands MFR shows more improvement in hamstring flexibility then Group A. Reasons behind more improvement in Group B can be –

Effectiveness of foam rolling is depending upon the participant's skill. So, this becomes very subjective. While performing foam rolling subjects have to lift their whole body weight on to their hands and have to maintain equal pressure between foam roller and muscle for entire treatment session. As weight and upper limb strength is not equal for all the subjects.⁽²⁷⁾

Biomechanically, the study should also explore whether foam rolling or myofascial release affects residual muscle tone. Lower tone in the hamstrings may be indicative of increased flexibility. The hamstring muscles consist of three primary muscles located on the back of the thigh: the biceps femoris, semitendinosus, and semimembranosus. These muscles are responsible for flexing the knee joint and extending the hip joint.

Myofascial release specifically targets the fascia, the connective tissue surrounding muscles. The main action here is releasing fascial restrictions, which can improve the sliding and gliding of muscle fibers and fascia. The techniques may influence neuromuscular control by reducing the stretch reflex response in the hamstrings. This action can temporarily improve muscle length and flexibility. Both foam rolling and myofascial release essentially focus on preparing and conditioning the hamstring muscles and surrounding tissues to allow for increased flexibility and improved muscle function. The muscle actions involved are crucial for addressing hamstring tightness and improving overall muscle performance.⁽²⁸⁾

Fascia surrounds muscles, tendons, and ligaments and plays a role in transmitting force. Myofascial release aims to address restrictions in the fascia, potentially improving the sliding between different layers. These techniques may influence the stretch reflex and neuromuscular control. Reducing muscle tension could decrease the stretch reflex's response, allowing for greater muscle elongation. This might be more pronounced in myofascial release. Consider the distribution of mechanical stress during the techniques.⁽²⁵⁾

Foam rolling evenly distributes pressure across a broader area, while myofascial release focuses on specific points. The distribution of stress can impact how the muscle and fascia respond. Foam rolling, with participants bearing body weight on their hands, introduces an additional load and requires upper limb strength. This mechanical aspect can vary among individuals and affect the efficacy of the technique. In myofascial release, practitioners often use their body weight and positioning to exert controlled force. The direction and magnitude of this force can impact the release of fascial restriction. Foam rolling and manual myofascial release (MFR) are both techniques used to improve flexibility and reduce muscle tension, with a focus on the hamstrings. While both methods can be effective, manual MFR often provides more immediate results within the same session.

The main reason for this difference is the specificity and intensity of manual MFR. When a skilled therapist or practitioner uses their hands to apply targeted pressure and stretching to the fascia and muscle tissue, they can address specific areas of tension or adhesions more effectively. This targeted approach can result in greater immediate gains in flexibility.⁽²⁵⁾

On the other hand, foam rolling is generally less precise and may not address specific points of tension as effectively. It is more of a self-massage technique that can help improve overall muscle and fascial health, but it may require repeated sessions for substantial gains in flexibility.⁽¹⁸⁾

Both foam rolling and manual MFR are effective within the group to enhance hamstring flexibility, but as per comparison manual MFR often provides more immediate improvements due to its specific and targeted nature.

VI. CONCLUSION

For improvement in hamstring flexibility in IT professionals working from home manual myofascial release was more effective treatment than foam roller.

VII. LIMITATION OF STUDY

Explore the potential benefits of combining these myofascial release techniques with other interventions, such as stretching, strength training, or other rehabilitation methods, to optimize outcomes

VIII. RECOMENDATION AND FUTURE SCOPE OF STUDY

Conduct more extensive comparative studies involving larger sample sizes.

Long term effect can be studied.

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