IJBPAS, July, 2026, 15(7): 3071-3079

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

TO COMPARE THE IMMEDIATE EFFECT OF SUBOCCIPITAL MUSCLE INHIBITION TECHNIQUE AND MFR ON HAMSTRING FLEXIBILITY IN YOUNG ADULT FEMALES

SRISHTI S[1], RINKAL Y[2] AND GAURAV P[3*]

1: MPT Scholar, Department of Physiotherapy, Ahmedabad Physiotherapy College, Parul University, Gujarat, India

2: Associate Professor, Department of Physiotherapy, Ahmedabad Physiotherapy College, Parul University, Gujarat, India; **Orchid ID:0000-0001-9479-0311**

3: Principal, Master in Neuroscience, Ahmedabad Physiotherapy College, Parul University, Gujarat, India; **Orchid ID: 0000-0002-7741-1786**

***Corresponding Author: Dr. Rinkal Parmar: E Mail: rinkal.parmar@paruluniversity.ac.in**

Received 10th June 2025; Revised 20th July 2025; Accepted 18th Sept. 2025; Available online 1st July 2026

https://doi.org/10.31032/IJBPAS/2026/15.7.10264

ABSTRACT

Introduction:

Hamstring tightness is a common musculoskeletal complaint that can limit functional movement, and various manual therapy interventions have been proposed to enhance flexibility. However, limited research exists comparing the immediate effects of SMI and MFR on hamstring flexibility. The purpose of this study is to determine the immediate effect on comparison between the suboccipital muscle inhibition technique and MFR on hamstring in young adult females.

Method:

Total 42 no. of individuals were divided into group one and group two. Group one was treated with myofascial release on hamstring tightness. Group two was treated with suboccipital muscle inhibition technique on hamstring. Pre and post sit and reach test were taken as an outcome measure and to check for the immediate effect on hamstring.

Result:

Result analysis was performed by the use of Microsoft excel and SPSS version 26. The study showed within group analysis for outcome measure in group one and group two with paired and unpaired t test was used and statistically significant ($p<0.05$).

Conclusion:

This study indicates that after analysis of both groups one (MFR) and two (Suboccipital muscle inhibition technique) shows individually effective for the improvement for hamstring flexibility. But Group B suboccipital muscle inhibition technique shows more effective significant changes.

Keywords: Hamstring flexibility, occipital muscle inhibition, MFR, Sit and reach test

INTRODUCTION:

The hamstrings are made up of three muscles that bend the knee. The hamstrings are made up of three muscles: the semitendinosus, semimembranosus, and bicep's femoris (long and short heads). The hamstrings cross two joints, so the hips are a three-joint muscle. The hamstring is situated on back region in the thigh (between the hip knee region) **[1]**.

Flexibility refers to the ability to move other joints and range of motion without pain. To increase hamstring flexibility, a range of methods and therapies are employed; static and dynamic stretching are the most popular forms of stretching. Enhancing hamstring flexibility can also be achieved by self or passive stretching **[2]**.

The pelvic region's posture is negatively affected when the hamstrings are shortened. A rise in hamstring rigidity puts more strain on the back and results in atypical lumbopelvic motions. The digits-to-floor distance and straight leg raising (SLR) tests can be used to measure hamstring shortening. Hamstring extensibility is deemed compromised when the fingertips cannot touch the floor when bending forward or when SLR is not more than 80° **[3]**. Most commonly strained muscles in the human body are the hamstrings. Hamstring flexibility varies depending on an individual's lifestyle. For example, tight hamstrings, most commonly seen in office workers, young adults, college students, and office workers (IT workers) and sedentary lifestyle reduce hamstring stretching. Hamstring tightness appears to increase from childhood until the age of 40, with a higher incidence in men than in women **[3]**. The muscular strength ratio to quadriceps and hamstring plays an important role in hip and knee joint stability as well. In addition, hamstring flexibility is important to maintain full range of motion (ROM) of joint and musculoskeletal function while preventing damages. Once flexibility decreases, risks of muscular and postural imbalance grow higher along with the risk

of muscular sprain **[4]**. Restoring hamstring flexibility is vital in the management of various musculoskeletal disorders **[5]**.

Furthermore, the flexibility of the hamstrings is important because knee extensor torque is affected by the flexion angle of the hip joint. As such, the flexibility of hamstrings is indispensable for improving physical performance **[6]**.

Tightness of the hamstrings reduces the lordotic curve, affects pelvic mobility, causes strain on the lumbar spine, and alters the lumbopelvic rhythm, which generates more strain on the lumbar segments, giving rise to low back pain **[7]**.

One among all the reasons, prime reason of irregularities in posture in contemporary world is the sedentary lifestyle. The majority of employment and educational programs need prolonged sitting, which can impair soft tissue flexibility, particularly in the muscles that support both joints. The suboccipital muscle inhibition technique was one of the physical therapy manipulation techniques included in this investigation. Changes in bodily flexibility are linked to the suboccipital muscle breaking technique **[8]**.

Sub-occipital muscle inhibition technique describes the steady pressure to soft tissues to effect relaxation and normalize reflex activity **[9]**.The suboccipital muscle inhibition (SMI) technique is a method of releasing tension in four muscles (rectus occipital major, rectus occipital minor, inferior oblique, inferior oblique) situated between axis which controls occiput and superior cervical spine) top; This muscle is known to be involved in the control of both head motion and spine alignment **[6]**.

Due to the connections of different parts of the superficial backline, it is possible to influence the hamstring by performing the technique in the lumbar area **[10]**.

Myofascial release of the hamstrings improves physical performance **[12]**. Like the sub occiput muscle release method, myofascial release (MFR) is another technique that is also a manual approach to stretching facial muscles and increasing their mobility. Myofascial release (MFR) is a method of manually stretching the fascia. Increasing joint mobility has been the main goal thus far **[15]**. Myofascial release (MFR) was believed to have the potential to improve daily functioning by reducing pain, increasing flexibility, and reducing disability **[16]**.

It is believed that elasticity plays a crucial role in typical biomechanical performance. It has been demonstrated that a lack of flexibility can cause neuromusculoskeletal symptoms, negatively affect an individual's degree of function, and put them at risk for several orthopaedic straining problems. Therefore, myofascial release is considered the most effective way to relieve muscle tension **[16]**.

Safe, effective, and non-stressful to the subject, fitness is positively impacted by hamstring MFR. Currently, MFR primarily appears to be beneficial in lowering pain, enhancing freedom of motion and flexibility, enhancing depression, and enhancing comfort of life (COL). Additionally, this approach has the advantage of being safe and effective. Previous studies have shown that physical performance primarily consists of walking speed, chair climbing ability, and balance ability, which are assessed in the lower extremities and are strongly influenced by quadriceps and hamstring strength. Therefore, hamstring flexibility is important **[17]**.

OBJECTIVE OF STUDY:

1. To investigate the suboccipital muscle inhibition technique's immediate efficacy within treating young adult females' hamstrings tightness.
2. To examine the immediate effectiveness of myofascial release technique for hamstring tightness in young adult females.

METHODOLOGY:

Data collection methods:

Research design: Comparative Study

Study sample size: 42 subjects with Hamstring Tightness.

Training period: 6 months

Study population: Young adult women

Data source: Bhopal, Ahmedabad.

CRITERIA

Inclusion criteria:

- Young adult female with hamstring strain.
- Participants willing to participate in the study
- Participants aged 18 to 25 years.

Exclusion criteria:

- Participants with orthopaedic problems (fractures, osteoarthritis, ligament damage, pain, paraesthesia).
- Mentally unstable participants.
- Participants with cardiovascular problems.
- Participants with abnormal BMI.
- Measures of Outcome: Sit and Reach Exam

OUTCOME MEASURES:

Sit and reach test [1]

The subjects sat with their feet approximately hip wide against the testing box. They kept their knees extended and placed the right hand over the left and slowly reached forward as far as they could by sliding their hands along the measuring board. Three trials were performed by the subjects; the averages of the trials were taken as measurement. There was no difference in concurrent validity between the two tests. However, the traditional SR was preferred because it reached better concurrent validity **[1]**.

Research Methods:

Based on the conditions for inclusion, a total of 42 individuals were enrolled in the present research and, with their assent, grouped into 2 distinct categories. Group A (N=21) – Myo fascial release of hamstrings. Group B (N=21) - Inhibition of suboccipital muscles. All participants were assessed with a parallel sitting and reaching test before and after measuring distances in cm.

Group A: MFR for hamstrings - 21 participants with hamstring tightness. Each participant in this group (n=21) was allocated a total of 15 minutes of sessions. The patient lies on his stomach. Light stroking is performed for 2-3 minutes. The therapist begins with closed fists and gentle pressure on the hamstrings from proximal to distal for 2 to 3 minutes. The myofascial release (MFR) technique is applied from the ulnar edge in a proximal to distal direction, applying light pressure to the hamstrings until skin laxity is relieved. Each stroke should be held for 30 seconds. The arm positions have been crossed to operate as energy efficiently as possible. All subjects are instructed not to perform any lower extremity flexibility or stretching exercises during the treatment period.

Group B: Suboccipital hamstring inhibition technique - 21 participants with hamstring tightness. Individual participants in this group (n=21) received a total of 15 minutes of sessions. With the patient seated the patient's hands are placed behind their backs, and the therapist palpates the atlanto posterior eminence—the area between the axial spine's atlanto spinous region and the external occiput tubercle—with their fingertips. The therapist uses the middle and outer digits of each hand to find the occipital clumps and the spinous groove of the C2 vertebra. The meta carpo phalangeal joints are then 90° flexed by physical therapist when they position the base of the cranium on the hand. The therapist was the target of upward pressure. The tissue was allowed to relax for two minutes under constant pressure. To prevent eye motions that could change the laxity of the sub occiput muscles, the subject's eyes must stay closed during the SM technique.

STATISTICAL ANALYSIS OF THE STUDY:

The goal of this study was to see how quickly MFR and the Sub occiput muscle inhibition approach affected young adult females. The SPSS version 26 was used for the examine of data. Sit and reach method was used to examine the data's distribution. Since the data was regularly distributed, statistical analysis was done using the parametric test. Pre-data was gathered prior to the operation starting, and post-analysis data was gathered using the sitting-and-reaching test as the outcome evaluation.

A comparison of the computed values was made using an un-paired t-test between

groups and a paired t-test within groups. Confidence level for study was kept 95 %. Significant level was kept <0.05.

RESULTS:

In order to determine the instantaneous efficacy between MFR and the sub occiput muscle inhibition approach in young adult females, a comparative study was carried out. Total forty-two participants were taken randomly in both the groups. All sample size calculation is based on the primary hypotheses. The test used for the statistical analysis is parametric test. A paired T test was used inside group and an un-paired T test was used between the groups in the analysis to compare the results.

Comparison between the group post variables of Group one and Group two was performed by un-paired t-test. The analysis to data were statistically result that t value for group One 0.00017 is much higher than Group Two t value 0.0000039.

Thus, statistical analysis demonstrated that the t values for the two groups differed significantly. Although the two approaches were successful, group two exhibits more notable and effective changes than group one.

Table 1: Comparison between both the group

Outcome		Mean	SD	T Value	P Value
Sit & Reach Method (Group One)	Pre	17.19	5.49		
	Post	10.33	5.23	0.00017	<0.0001
Sit & Reach Method (Group Two)	Pre	19.1	5.18		
	Post	10.76	4.93	0.0000039	<0.0001

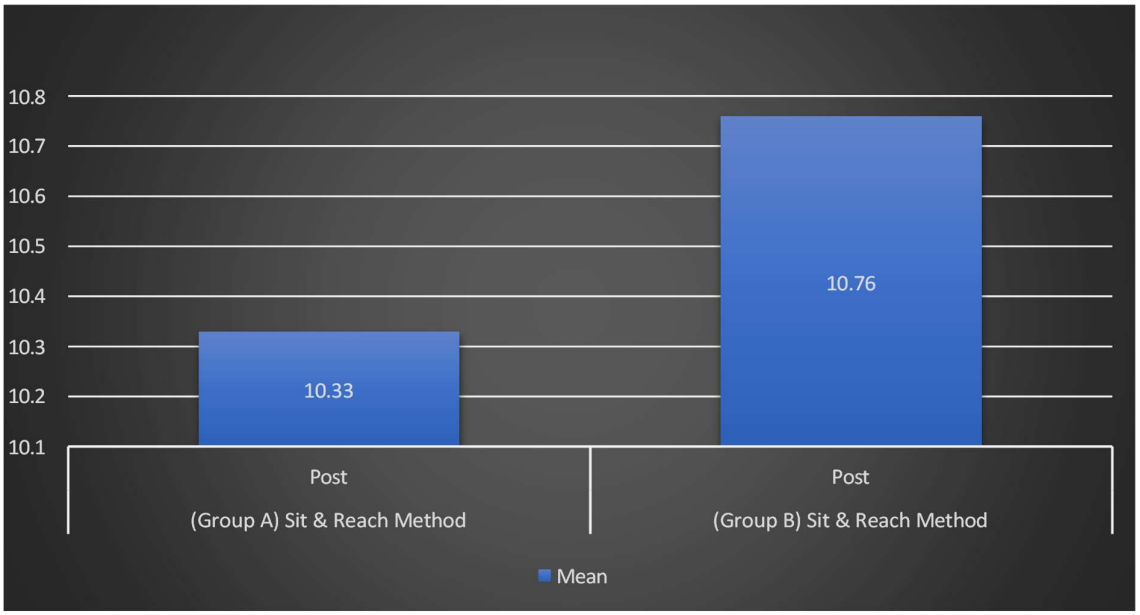

Figure 1: Between the group analysis for Group One and Two

DISCUSSION:

Primary objective of this investigation to evaluate the immediate impact on the hamstring young adult females MFR and suboccipital muscle inhibition. Walking, sprinting, jumping, and controlling certain trunk movements all depend on the hamstring muscle. A sporadic back line that shields the body's entire rare surface during sub occiput muscle inhibition connects the hamstring and sub occiput muscles. This sporadic back line was loosened up as a result of the sub occiput muscles relaxing.

In order to improve hamstring flexibility in young adult females this study was conducted There were forty-two subjects in the study. Study was categorised into 2 groups one (MFR) and two (Suboccipital muscle inhibit-ion technique). Time duration for the treatment was 2 -3 minutes Group one and group two was assessed with sit and reach method as an outcome measure. Both the groups were assessed pre and post. Group one was perceived with MFR on hamstring and group two with suboccipital muscle inhibition method. Statistical analysis of the study shows statistically noteworthy of group one and group two ($p<0.05$). Within the batches comparison of the outcome measure was showed significantly effective.

CONCLUSION:

This study indicates that after analysis of both groups one (MFR) and two (Subocciput muscle inhibit-ion technique) shows individually effective for the improvement for hamstring flexibility. But group two subocciput muscle inhibit-ion technique shows greater effect in improvement than group one on hamstring flexibility.

Acknowledgement:

My heartfelt gratitude to all the participants who contributed to this study. I am also thankful to the ethical committee for their approval and guidance. A very deepest appreciation to my guide, Dr Rinkal Yadav for her support and encouragement throughout the research processes. I am truly grateful for her continuous involvement and suggestions.

REFERENCES:

[1] Prajapati UM, Shukla YU. Effect of Suboccipital Muscle Inhibition Technique on Hamstring Tightness in Healthy Adults-An Interventional Study.

[2] Eparicio ÉQ, Quirante LB, Blanco CR, Sendín FA. Immediate effects of the suboccipital muscle inhibition technique in subjects with short hamstring syndrome. Journal of Manipulative and Physiological Therapeutics. 2009 May 1;32(4):262-9.

[3] Cho SH, Kim SH, Park DJ. The comparison of the immediate effects of application of the suboccipital

muscle inhibition and self-myofascial release techniques in the suboccipital region on short hamstring. Journal of physical therapy science. 2015;27(1):195-7.

[4] Jung J, Choi W, Lee Y, Kim J, Kim H, Lee K, Lee J, Lee S. Immediate effect of self- myofascial release on hamstring flexibility. Physical therapy rehabilitation science. 2017 Mar 30;6(1):45-51.

[5] Joshi DG, Balthillaya G, Prabhu A. Effect of remote myofascial release on hamstring flexibility in asymptomatic individuals–A randomized clinical trial. Journal of bodywork and movement therapies. 2018 Jul 1;22(3):832-7.

[6] Itotani K, Kawahata K, Takashima W, Mita W, Minematsu H, Fujita H. Myofascial release of the hamstrings improves physical performance—A study of young adults. InHealthcare 2021 Jun 4 (Vol. 9, No. 6, p. 674). MDPI.

[7] Hasaneen, B.H., Eweda, R.S. & Hakim Balbaa, A.E. Effects of the suboccipital muscle inhibition technique on pain intensity, range of motion, and functional disability in patients with chronic mechanical low back pain. Bull Fac Phys Ther 23, 15–21 (2018).

[8] Kang HS, Kwon HW, Kim DG, Park KR, Hahm SC, Park JH. Effects of the Suboccipital Muscle Inhibition Technique on the Range of Motion of the Ankle Joint and Balance According to Its Application Duration: A Randomized Controlled Trial. InHealthcare 2021 May 29 (Vol. 9, No. 6, p. 646). MDPI.

[9] Jagtap PK, Mandale SD. The effect of suboccipital muscle inhibition technique on hamstring tightness patients. Journal of Evolution of Medical and Dental Sciences. 2015 Apr 23;4(33):5682-90.

[10] Tamartash H, Bahrpeyma F, Dizaji MM. The effect of remote myofascial release on chronic nonspecific low back pain with hamstrings tightness. Journal of Sport Rehabilitation. 2023 Mar 16;32(5):549-56.

[11] Rahman SR, Deepthi G, Singh K, Wah YC. Effect of Myofascial Release on Hamstring Tightness among Knee Osteoarthritis Patient. Journal of Positive School Psychology. 2022 Mar 17;6(3):4027-34.

[12] Sakhalkar K, Nagulkar J, Mahajan P. Effectiveness of myofascial release versus passive stretching on hamstring flexibility in amateur football players-a comparative

study. International Journal of Health Sciences and Research. 2022 Nov 8.

[13] Ajimsha MS, Al-Mudahka NR, Al-Madzhar JA. Effectiveness of myofascial release: systematic review of randomized controlled trials. Journal of bodywork and movement therapies. 2015 Jan 1;19(1):102-12.

[14] Patel A, Patel N, Patel M. Immediate Effects of Muscle Energy Technique versus Myofascial Release Techniques on Hamstring Flexibility in Footballers: A Comparative Study.

[15] Purushothaman VK. Myofascial Release Therapy versus Muscle Energy Technique on Hamstring Flexibility in Physically Inactive Students–A Randomized Controlled Trial.

[16] Jilin Daxue Xuebao (Gongxueban)/Journal of Jilin University (Engineering and Technology Edition) Vol: 41 Issue: 04-2022(Issue: 04-2022):4-2022

[17] Carolyn Kisner, Lynn Allen Colby. Therapeutic Exercise foundation and Techniques. 6 Th Edition, 2012.