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To Study the Immediate of Myofascial Decompression Cupping Therapy and Conventional Stretching on Hamstring Tightness and Balance in Physiotherapy Students: A Comparative Study

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ABSTRACT

Background: Myofascial decompression (MFD), or cupping therapy and Conventional stretching are common techniques utilized to improve hamstring tightness and balance. MFD is a negative pressure soft tissue treatment technique using suction to manipulate the skin and underlying soft tissues. Stretching is also usually incorporated as pre-exercise as it has been suggested to improve muscle flexibility, prevent muscle injury and enhance physical performance.

Purpose of the Study: Aim of this study was to assess whether Myofascial Decompression or Conventional Stretching techniques was more reliable in improving hamstring flexibility and balance improvement in Physiotherapy students.

Method: The present study was conducted in M.B Gohil Institute of Medical Science and Research Center, Navsari, Gujarat. The study includes 50 physiotherapy students divided into two groups using convenient sampling who have age between 18-25 years. One group undergone MFD technique and the other group undergone conventional stretching, the study was conducted for only one day. The AKET was performed before and after the treatment to observe the improvement in range of motion and hamstring flexibility, likewise the SEBT was performed before and after the treatment to observe the improvement in balance.

Outcome Measures: Active knee extension test (AKET) and Star excursion balance test (SEBT).

Statistical Analysis: Statistical analysis was done using SPSS 26 software.

Results: Study was done among 50 students, in which 25 students were undergone MFD technique and other 25 were undergone conventional stretching technique. The hamstring muscle flexibility increased in both the groups i.e., 2.55% in cupping group and 2.49% in stretching group. So, both the techniques are very effective to relieve hamstring tightness. The balance improves in each direction of both the groups i.e., anterior, anteromedial, medial, posteromedial, posterior, posterolateral, lateral and anterolateral. So, both the techniques are equally effective to improve balance.

Conclusion: This study indicates that both the techniques are very effective to improve hamstring tightness. Here, myofascial decompression technique has slightly better improvement result than conventional stretching, but it is not significant enough to state that MFD is far better than Conventional stretching. Considering the limitation of MFD is very good alternative with similar results on hamstrings according to our research.

Keywords: Hamstring tightness; Active knee extension test (AKET); Star excursion test (SEBT); Myofascial decompression (MFD); Conventional stretching.

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INTRODUCTION

The hamstring muscle complex is comprised of three individual muscles and plays a critical role in human activities ranging from standing to explosive actions such as sprinting and jumping. The semitendinosus, semimembranosus, and biceps femoris muscles comprise the hamstring muscle group.[1]

The hamstring muscle group plays a prominent role in hip extension (posterior movement of the femur) and knee flexion (posterior movement of the tibia and fibula). Concerning the gait cycle, the hamstrings activate beginning at the final 25% of the swing phase generating extension force at the hip and resisting knee extension. The hamstring muscles also play an essential role as a dynamic stabilizer of the knee joint. Operating in tandem with the anterior cruciate ligament (ACL), the hamstrings resist anterior translation of the tibia during the heel strike phase of the gait cycle.[1]

Hamstring muscles are well known for their great tendency to shortening, which is due to their multijoint condition, their tonic postural character, and considerable amount of tensional forces to which they are constantly submitted.[2]

Hamstring tightness is caused by extended or prolonged sitting at work places and educational institutions, inadequate physical activity, genetic predisposition, previous injury to hamstring. Modern sedentary life style is one of the main reasons for postural abnormality. Most of the work place and educational setups have prolonged sitting hours which can easily hampered flexibility of soft tissues, especially in muscle which has multiple attachments. It is important to study hamstring flexibility in students who have long sedentary hours of studying along with lack of physical activities to create awareness about lack of normal flexibility and preventing complications.[15]

Hamstring tightness may be measured using the active unilateral SLR test, the passive unilateral SLR test; the sit and reach test, and the active knee extension test (AKET). The AKET measures hamstring tightness by the angle subtended by knee flexion after a maximum active knee extension, with the hip stabilized at 90 degrees.[13] The SEBT has been used to assess dynamic postural control. It has been proposed to challenge dynamic postural control because the subject must maintain balance on a single limb, whilst the other limb carries out a series of reaching tasks. Moreover, the SEBT reach distance is correlated with hip range of motion (ROM) and strength.[14]

This study is undertaken as there is lack of literature on prevalence and severity of hamstring tightness among college going students.[11]

The purpose of this study was to examine the immediate effect on hamstring flexibility by comparing two treatments,[1] Myofascial Decompression (MFD),[2] Conventional Stretching. The objectives of this study is twofold. The first objective is to determine if an acute bout of MFD is beneficial in improving flexibility and range of motion (ROM) of the hamstrings compared to Conventional Stretching on patients diagnosed with hamstring tightness. The second objective is to examine patient-reported perceptions of pain, flexibility and impact of a single treatment of MFD on their hamstring.[4]

METHODOLOGY

Study Setting

M.B Gohil Institute of Medical Science and Research Center, College of Physiotherapy, Navsari, Gujarat, India.

Study Population

Physiotherapy students of M.B Gohil college of physiotherapy.

Study Design

A comparative Study.

Study Duration

The study was undertaken for a total of 6 months.

Study Sample Design

Convenient Sampling.

Sample Size

Approximately 50 college going students.[11]

Each group has 25 samples

Materials Used:

1. Padded Plinth
2. Vertical bar
3. Universal Goniometer
4. Cupping Kit
5. Coconut oil
6. Radium Tap
7. Measuring Tap
8. Weight machine
9. Pen and paper

SELECTION CRITERIA

Inclusion Criteria

1. Age group between 18 to 25 years
2. Gender: Males and Females
3. Subjects with at least 150 loss of knee extension, when hip held in 900 flexion were included in the study.

Exclusion Criteria:

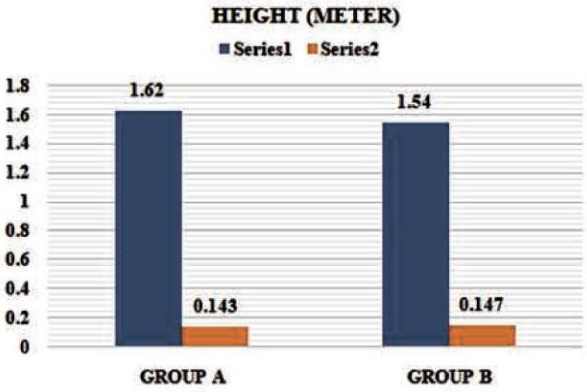
1. Subject with any past hamstring injury with in last 2 years.
2. Low back pain since past 2 months.
3. Lumbar and lower limb neurological compromise were excluded.

RESULT

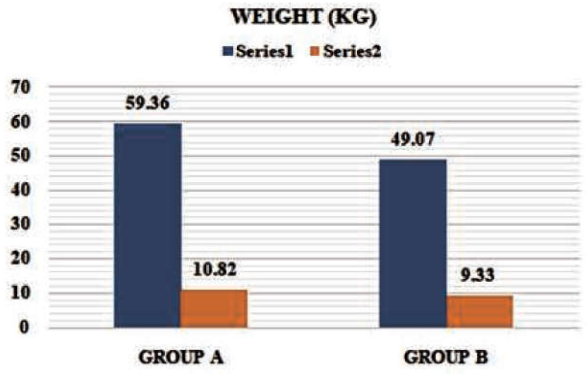
Table 1: Shows mean of Height, Weight and BMI among the participants.

Variable	Group A	Group B
Height	1.62±0.14	1.54±0.14
Weight	59.36±10.82	49.07±9.33
BMI	22.32±3.90	19.55±3.26

Graph 1.1: Shows the average Height of subjects.



Graph 1.2: Shows the average Weight of subjects.



Graph 1.3: Shows the average BMI of subjects.

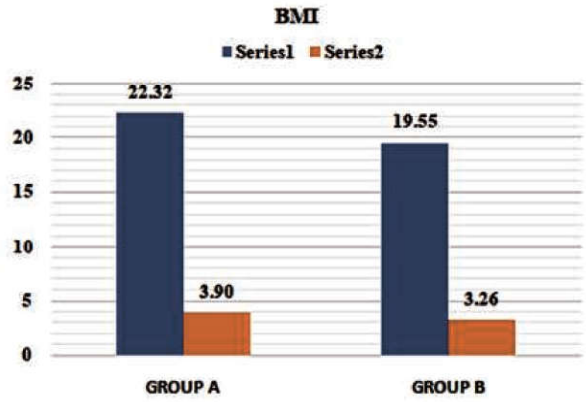


Table 2: Shows the gender distribution of subjects.

–	Female	Male
Group A	13	12
Group B	25	0

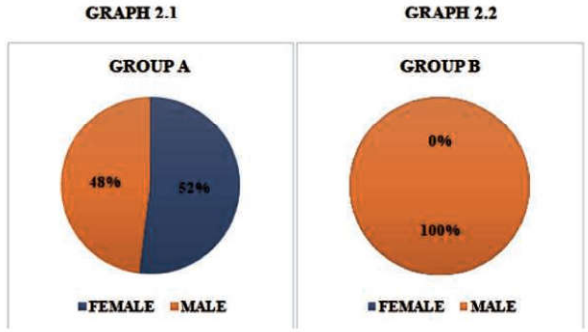
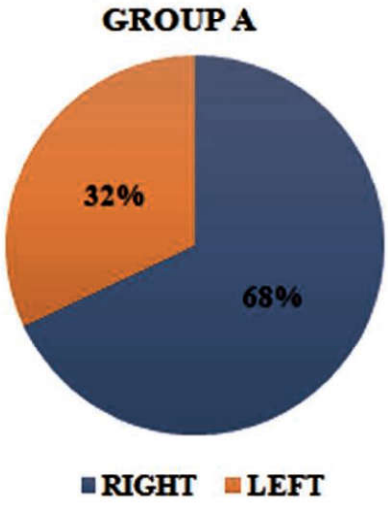


Table 3: Shows the affected side of the subjects.

Affected Side	Group A	Group B
Right	17	20
Left	8	5

Graph 3.1: Shows the affected side of the subjects of Group A.



Graph 3.2: Shows the affected side of the subjects of Group B.

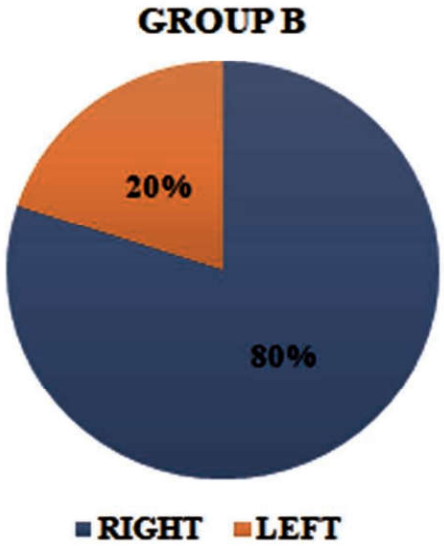


Table 4.1: Intra group comparison of Active Knee Extension Test (Group A).

Variable	Data	Mean ± SD	P- value	t-value	t critical	df
Aket	Pre	2.37±0.15	0.00	11.74	2.06	24
	Post	2.55±0.15				

Graph 4.1: Shows intra group comparison of Active Knee Extension Test (Group A) after immediate effect.

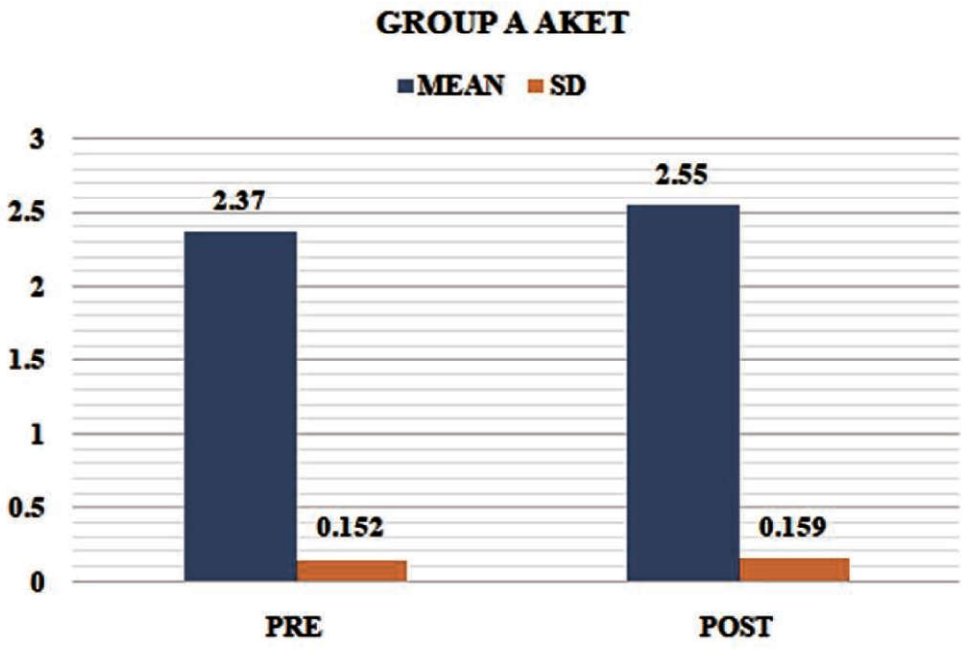


Table 4.2: Intra group comparison of Active Knee Extension Test (Group B).

Variable	Data	MEAN±SD	P value	t-value	t critical	df
Aket	Pre	2.95±0.17	0.00	14.53	2.06	24
	Post	2.42±0.18				

Graph 4.2: Shows intra group comparison of Active Knee Extension Test (Group B) after immediate effect.

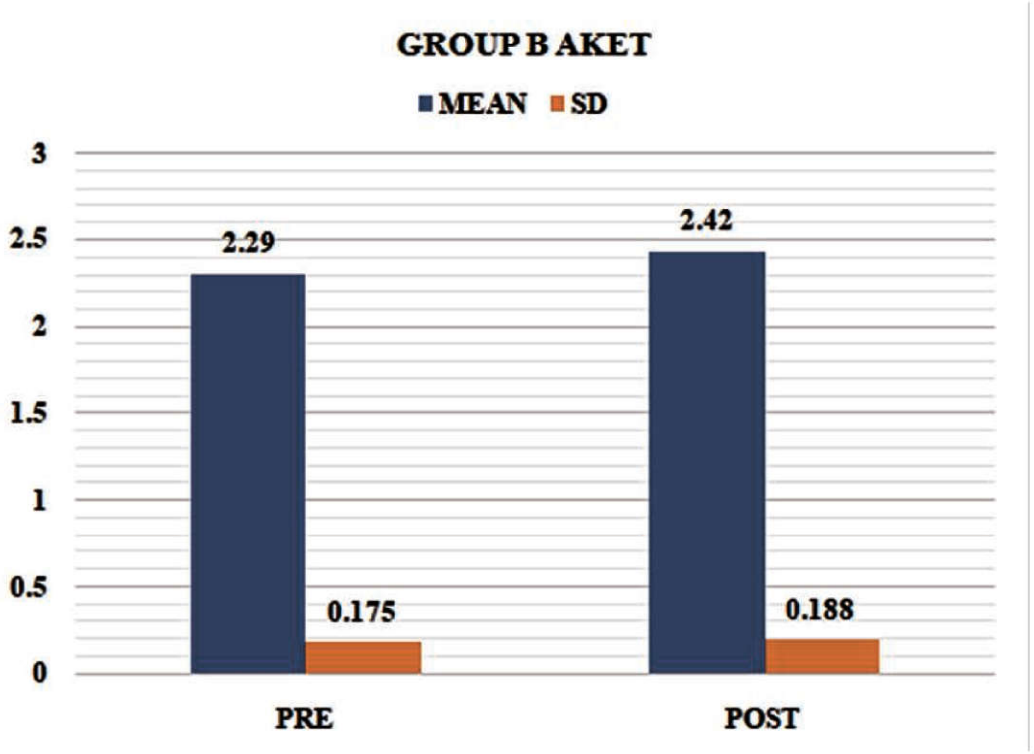


Table 5.1: Intra group comparison of Star Excursion Balance Test (Group A).

Direction	Level	MEAN±SD	P value	t critical	/t/ value	df
Anterior	Pre	81.42±0.08	0.00	2.06	6.26	23
	Post	88.8±0.05				
Anteromedial	Pre	84.36±0.06	0.00	2.06	4.07	23
	Post	89.6±0.05				
Medial	Pre	81.37±0.09	0.02	2.06	2.45	23
	Post	86.99±0.07				
Posteromedial	Pre	78.7±0.09	0.00	2.06	3.09	23
	Post	83.78±0.07				
Posterior	Pre	72.7±0.08	0.00	2.06	5.04	23
	Post	81.4±0.09				
Posterolateral	Pre	75.08±0.1	0.00	2.06	3.23	23
	Post	79.24±0.09				
Lateral	Pre	73.81±0.09	0.09	2.06	1.74	23
	Post	77.14±0.11				
Anterolateral	Pre	79.09±0.07	0.00	2.06	4.20	23
	Post	85.04±0.08				

Graph 5.1: Shows intra group comparison of Star Excursion Balance Test (Group A) after immediate effect.

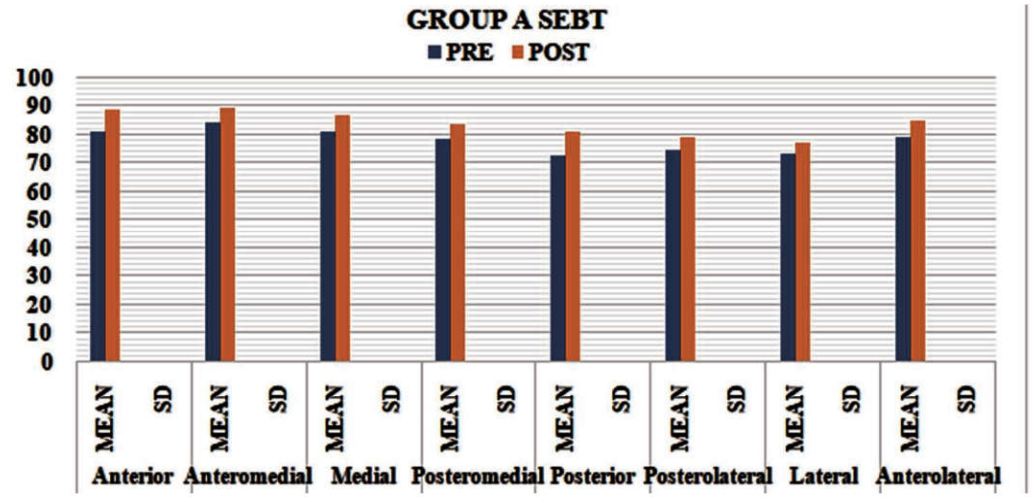


Table 5.2: Intra group comparison of Star Excursion Balance Test

Direction	Level	MEAN±SD	P value	t critical	/t/ value	df
Anterior	Pre	81.78±0.06	0.00	2.06	4.87	23
	Post	88.59±0.08				
Anteromedial	Pre	83.82±0.07	0.00	2.06	3.50	23
	Post	89.87±0.08				
Medial	Pre	84.98±0.07	0.00	2.06	4.92	23
	Post	91.02±0.09				
Posteromedial	Pre	81.73±0.09	0.00	2.06	5.57	23
	Post	87.47±0.09				
Posterior	Pre	73.18±0.09	0.00	2.06	4.59	23
	Post	79.73±0.1				
Posterolateral	Pre	70.67±0.09	0.00	2.06	4.56	23
	Post	78.4±0.1				
Lateral	Pre	69.12±0.1	0.00	2.06	3.39	23
	Post	75.74±0.12				
Anterolateral	Pre	75.54±0.09	0.00	2.06	3.56	23
	Post	81.82±0.1				

Graph 5.2: Shows intra group comparison of Star Excursion Balance Test (Group B) after immediate effect.

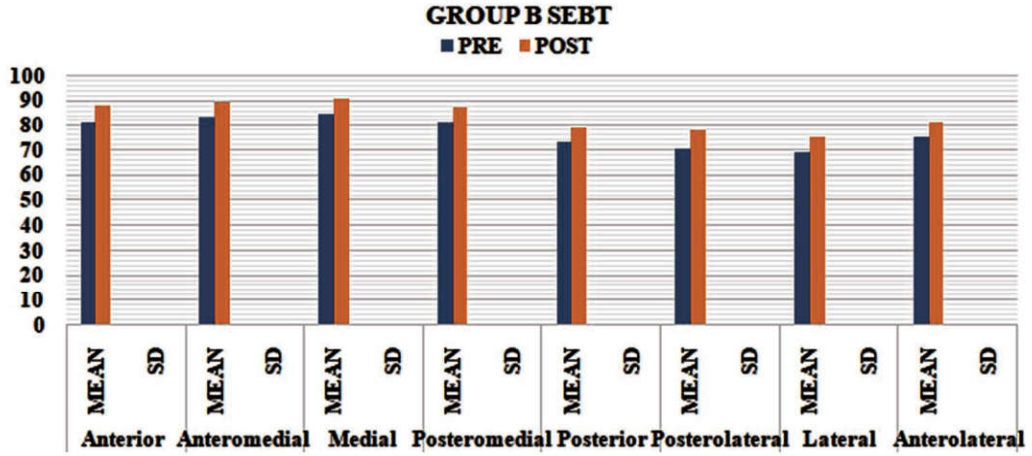


Table 6.1: Inter group comparison of Active Knee Extension Test.

–	MEAN±SD	P-value
Group A	2.55±0.15	0.01
Group B	2.42±0.18	

Graph 6.1: Shows inter group comparison of Active Knee Extension Test of Group A and Group B after immediate effect.

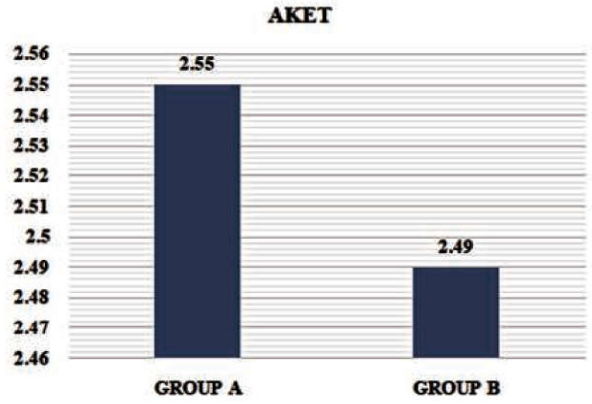
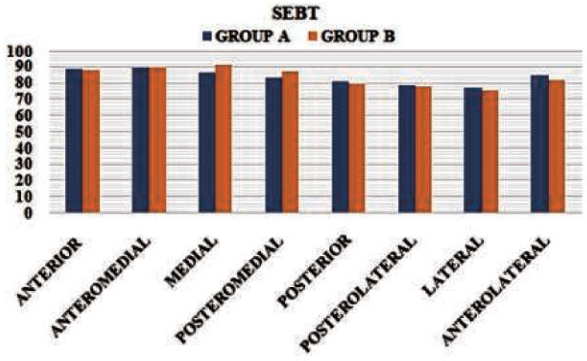


Table 6.2: Inter group comparison of Star Excursion Balance Test

Direction	Group A	Group B	P-value
Anterior	88.80±0.05	88.59±0.08	0.91
Anteromedial	89.60±0.05	89.87±0.08	0.89
Medial	86.99±0.07	91.02±0.09	0.10
Posteromedial	83.78±0.07	87.47±0.09	0.14
Posterior	81.40±0.09	79.73±0.1	0.55
Posterolateral	79.24±0.09	78.40±0.1	0.76
Lateral	77.14±0.11	75.74±0.12	0.67
Anterolateral	85.04±0.08	81.82±0.1	0.23

Graph 6.2: Shows inter group comparison of Star Excursion Balance Test of Group A and B after immediate effect.



DISCUSSION

The current study was conducted for a comparison between the immediate effect of MFD Cupping Therapy and conventional stretching on hamstring tightness and balance on physiotherapy students – a comparative study.

There are a multiple of physiological changes that are speculated to occur with cupping therapy that influence tissue change. The orthopaedic effects of an application of cupping therapy could include: an increase in blood circulation, 16 alleviate pain, 17, 18 reduce swelling, 18 regulate body temperature, 16 increase skin temperature, 19 decrease blood pressure, 19 irritate the immune system causing local inflammation, 20 and improve neurophysiological performance, 21 Furthermore, cupping has been theorized to loosen connective tissue, which could result in increased flexibility. 22An increase in blood flow and tissue temperature has been proposed to increase flexibility following other tissue mobilization techniques.[36, 37]

Aric J warren PhD, ATC et al. 2010 concluded that MFD is beneficial in making an acute clinically relevant difference in hamstring flexibility after a single treatment in patients with complaints of hamstring pathology symptoms. MFD can be used as an effective treatment modality to address limitations in hamstring flexibility.

The improvements in ROM observed after static stretching training might be explained by the fact that in static stretching there is a great possibility of increasing the number of sarcomeres in series (muscle length) due to longer exposure to the stresses generated in the specific degree of stretching, which remains constant (Bandy and Sanders, 2001). In addition, stretching increases viscoelasticity and decreases stiffness of muscular and connective tissues. Stretching itself enhances blood supply in joints and muscles, helping to warm them up, which improves functional performance during sports and activities of daily living (Savelberg and Meijer).

Winter et al. 2004 reported that passive stretching is characterized by the external addition of stretch stimulation on muscle contraction. Holding the stretch position, the excitatory spinal motor neurons overcome gamma inhibitory neuron impulses.

The result of the study shows that which technique is better between MFD and conventional stretching on hamstring tightness and balance. Here in the result the difference between two technique outcomes is not significant to state one technique is better than the other one. The hamstring muscle flexibility increases in both the groups. So, both the techniques are equally effective to relieve hamstring tightness and balance. According to our research we can say that MFD is slightly more effective

than conventional stretching to relieve hamstring tightness but the balance is equally improved in both the groups.

CONCLUSION

Present study was done at M.B Gohil Institute of Medical and Research center among the physiotherapy students to determine which technique is better to improve hamstring tightness and balance. Both the techniques are very to improve hamstring tightness. Here, myofascial decompression technique has slightly better improvement result than conventional stretching, but it is not significant enough to state that MFD is far better than Conventional stretching. Considering the limitation of MFD is very good alternative with similar results on hamstrings according to our research.

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