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Research Article

Comparative effects of graston technique and foam roller on the flexibility of hamstring muscle

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Abstract

Background: The incidence of hamstring tightness is one of the typical finding in the individuals with sedentary life style. The objective of this study was to find out the comparative effect of Graston technique and Foam roller on the flexibility of hamstring muscle.

Methods: A total of 30 subjects were randomized into 2 equal groups. The patients in group A received Graston Technique while Group B was treated with Foam Roller. Treatment duration was 2 sessions per week for six weeks. Data was analyzed using IBM-SPSS version 23.0. Mean \pm SD reported for flexibility of hamstring muscle at day-01 and day-12. Paired sample t-test was used for within group analysis. One-way analysis of variance was also done to compare the post treatment scores.

Results: In Myofascial Release group the mean flexibility at day-01 was 56.73 ± 8.97 and at day-12 it was 65.87 ± 9.49 . In Graston group the mean flexibility at day-01 was 52.60 ± 9.14 and at day-12 it was 65.47 ± 9.41 , results showed 12.86 units significant increase was observed in flexibility of hamstring muscle at day-12 with p-value less than 0.01.

Conclusion: It has been concluded from the study that Graston technique was found to be more effective as compared to muscle foam roller.

Keywords: Graston technique, foam roller, flexibility

INTRODUCTION

The most significant component of physical fitness is flexibility. Flexibility is defined as the capability to move a joint effortlessly through its full Range of Motion (ROM). The Flexibility of a particular joint can be influenced by many factors including the bony alignment and structures surrounding the joint. For illustration, there is a significant difference in the biomechanics of the elbow and the shoulder joint because of their different joint types. A hinge joint and a ball and socket variety of joints can't move in the same way. Other potential elements that can influence joint mobility and flexibility include age, activity level, gender, health status, and characteristics of the surrounding soft tissues including muscles, tendons, etc. Females usually have more flexible joints; however, exceptions may exist. Irrespective to gender flexibility tends to decline with age [1]. Hamstring muscles are constituted by a group of four muscles, three of them share a common origin that is from the ischial tuberosity and then diverged to connect to the distal part of the knee joint. In addition to knee flexion and extension, the hamstrings also act at the hip joint to extend it and also play its part in girdle rotation it's tilting and rotates sacrum too [2]. For the assessment of flexibility of most commonly used measures are used which include the Active-Knee-Extension (AKE) and the straight-leg-raise test [3]. A diverse variety of techniques are available to increase the length of the musculotendinous unit. Different techniques which can be incorporated include classical stretching techniques comprises of static (active, passive), dynamic (active, ballistic) stretching ways, Proprioceptive Neuromuscular Facilitation (PNF) pre-contraction stretching, post-isometric relaxation) stretches (19) or myofascial techniques like myofascialunharness or Rolfing can be used [4].

The Graston Technique is one amongst the common soft tissue mobilization techniques associated is categorized as the associate Instrument-Assisted Soft Tissue Mobilization (IASTM). It treats a wide range of soppo tissue injuries, like sprains, strains, and general pathology of soppo tissues [5]. Recently, foam rolling has become a preferred technique for skilled and non-professional athletes as a self-massager and for self-myofascial allows running free. The technique

involves little back and forth undulations over a dense Foam Roller (FR), directed from the proximal to the distal portion of the muscle or the different means around [6]. The objective of this study was to find out the comparative effect of Graston technique and Foam roller on the flexibility of hamstring muscle. There is lot of studies which found the effects of graston technique and foam roller technique on hamstring muscle on individual basis. But there are very minimum studies which found the effects of these techniques on comparative basis for the flexibility of hamstring muscle.

METHODOLOGY

It was a randomized control study was which was carried out Isra University Karachi. After the ethical approval data was collected from selected participants. Sample was collected by simple random sampling and chitt method was used for randomization. A total of 30 students with informed consent were included in the study. Inclusion criteria involved both male and female with age range of 18-25, Students having limitation of hamstring muscle between 30 degree to 45 degree hip flexibility (90-90 straight leg raise test). While excluded were those who had any hamstring injury in the past 2 months, Students, who have any skin infections, had any surgeries on their lower extremities within the last 6 months and Had lumbar disc herniation (Leg raise test). Data was collected through Universal Goniometer (Baseline HiRes™ 12-1000HR), Graston Instrument (GT-1) and FoamRoller (Length 3 ft and width 5.5 inch). 30 subjects having short hamstring were randomized into 2 equal groups with 15 subjects in each group. In both groups, shortening of hamstrings was identified by Goniometer. Assessment Performa was filled up by the therapist and measurement on the first day (pre-test scores) before starting the treatment. The patients in group A received Graston Technique while group B was treated with Foam Roller. Treatment duration was 2 sessions per week for six weeks [7]. Data were stored and analyzed using IBM-SPSS version 23.0. Count and percentages were reported for baseline characteristics of studied samples. Mean with standard deviation reported for flexibility of hamstring muscle at day-01 and day-12. Paired sample t-test was used to measure the effect of treatments. One way analysis of variance was

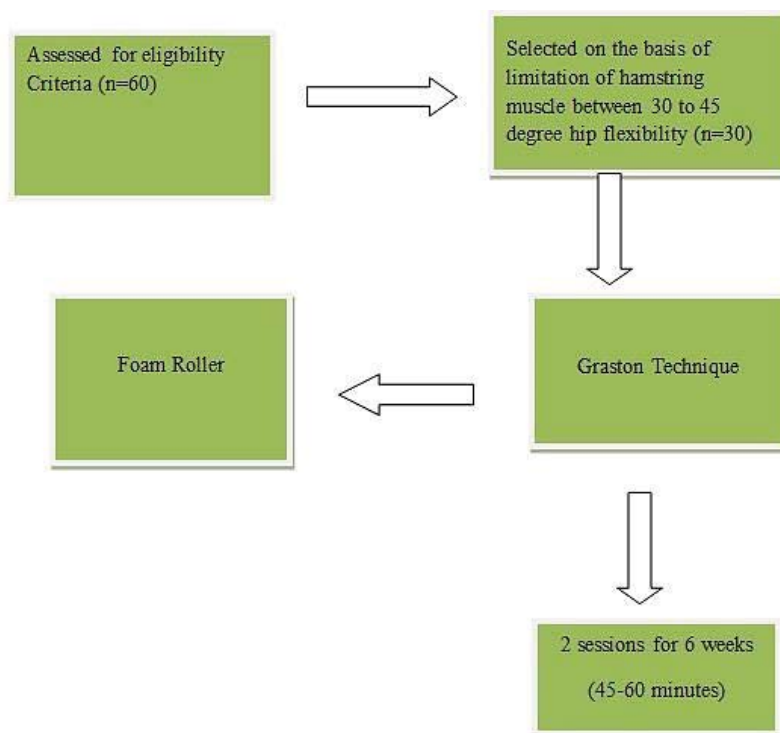


Fig 1. Consort Diagram

also done to compare the post treatment scores across two treatment groups. p-values less than 0.05 were considered significant. Bar chart also used to give graphical presentation of data (Figures 1-3).

RESULTS

Table 1 reports the baseline characteristics of studied samples. In the present study there were 30 subjects divided into two treatment groups. Each treatment group contains 15 subjects among them 46.7% were male samples and 53.3% were female samples. In Myofascial Release group the mean flexibility at day-01 was 56.73 ± 8.97 and at day-12 it was 65.87 ± 9.49, results showed 9.13 units significant increase was observed in flexibility of hamstring muscle at day-12 with p-value less than 0.01. Table 2 and Table 3 gives the mean comparison of flexibility of hamstring muscle of patients at day-01 of treatment and at day-12 of treatment. In Graston group the mean flexibility at day-01 was 52.60 ± 9.14 and at day -12 it was 65.47 ± 9.41, results showed 12.86 units significant increase was observed in flexibility of hamstring muscle at day-12 with p-value less than 0.01.

Table 2. Mean Comparison of flexibility of hamstring muscle

Treatment		Mean	SD	Mean Difference	p-value
Graston	Day-01	52.6	9.41	-12.86	<0.01*
	Day-12	65.47	6.25		
Myofascial Release	Day-01	56.73	8.97	-9.13	<0.01*
	Day-12	65.87	9.49		

*p<0.05 was considered significant using Paired Sample t-test

Table 3. Mean Comparison of post Flexibility of Hamstring Muscle among Treatments

Treatments	N	Mean	Std. Deviation	p-value
Graston	15	65.47	6.25	0.182
Myofascial Release	15	65.87	9.49	

p-value obtained using one way ANOVA



Fig. 2. Graston Technique (G1 Instrument)



Fig. 3. Foam Roller (High Density)

Table 1. Baseline Characteristics of Samples (n=30)

Gender	Graston (n=15)		Myofascial Release (n=15)	
	n	%	n	%
Male	7	46.7	7	46.7
Female	8	53.3	8	53.3

DISCUSSION

The aim of the study was to check the effectiveness of Graston technique and foam roller on the flexibility of hamstring muscle. The incidence of tightness of hamstring muscle is one of the typical finding in the individuals with sedentary life style. It is treated by a wide range of Physical therapy methods and diagnosed by physical examination.

Findings of the current study revealed that participants receiving Graston technique showed improvement in flexibility of hamstring muscle of patients at day-01 of treatment and at day-12 of treatment. In Graston group the mean flexibility at day-01 was 52.60 ± 9.14 and at day-12 it was 65.47 ± 9.41, results showed 12.86 units significant increase was observed in flexibility of hamstring muscle at day-12 with p-value less than 0.01.

In year 2016 a study was done by Jong Hoon Moon et.al to research the result of Graston Technique on hamstring extensibility and pain intensity in patients with nonspecific low back pain. Each teams showed a big improvement once intervention. Compared to the static stretching group, the Graston technique group had considerably a lot of improvement in hamstring extensibility. They ended that the Graston Technique may be an easy and effective intervention in nonspecific low back pain patients to improve hamstring extensibility and lower pain intensity, and it might be helpful in clinical apply [8].

A study was done in 2016 by Fousekis K et al. and ended that MTrPs analysis and treatment may be difficult condition for each the sports physical therapists and athletes. Ergon © IASTM, cupping, and ischemic pressure techniques are effective, however not comparable, in reducing tenderness of Myofascial Trigger Points (MTrPs). Ergon© IASTM technique appear to has considerably higher leads to reducing the adverse effects of MTrPs than each different 2 techniques as its application resulted in an exceedingly meaning applied statistical improvement of pain symptoms [9].

Findings of the current study revealed that participants receiving foam roller technique showed improvement in flexibility of hamstring muscle of patients at (Myofascial Release group) the mean flexibility at day-01 was 56.73 ± 8.97 and at day-12 it was 65.87 ± 9.49, results showed 9.13 units significant increase was observed in flexibility of hamstring muscle at day-12 with p-value less than 0.01.

In the year 2016 a study was done by Daniel Junker et al. and concluded that foam roll is often seen as a good tool to extend hamstring flexibility inside four weeks. The results area unit comparable the scientifically established contract-relax PNF stretching methodology [10,11].

In the year 2015 a study was done by Scott W. Cheatham et al. and concluded that the results of SMR remains rising. The results of this analysis suggests that foam rolling and roller massage is also effective interventions for enhancing joint storage and pre and post exercise muscle performance. However, as a result of the no uniformity of ways among studies, there presently isn't any agreement on the optimum SMR program.

CONCLUSION

It has been concluded from the study that both techniques Graston technique, and foam roller were found to be effective in the treatment of the flexibility of hamstring muscle but Graston technique was found to be more effective as compared to muscle foam roller in the patients with hamstring muscle tightness.

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