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## To compare the immediate effect of foam rolling versus post isometric relaxation technique on hamstring tightness in collegiate students: A comparative experimental study

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### Abstract

**Introduction:** Foam rolling breaks up the fibrous adhesions in the fascia, which enables the muscle to glide freely, thus improving range of motion <sup>[1]</sup>. Post isometric relaxation refers to the effect of reduced tone experienced by a muscle/group of muscle, after brief periods of isometric relaxation <sup>[2]</sup>. A lack in hamstring extensibility induces changes in lumbopelvic rhythm, causes hamstring strain or low back pain <sup>[3]</sup>.

**Objective:** 1. To determine the immediate effect of Post isometric relaxation technique on hamstring tightness in collegiate students.  
2. To determine the immediate effect of foam rolling on hamstring tightness in collegiate students.  
3. To compare the immediate effect of post isometric relaxation versus foam rolling on hamstring tightness in collegiate students.

**Method:** Total 20 subjects were included in the study based on the inclusion criteria that individuals must have AKE lag greater than 20° and exclusion criteria includes individuals with recent lower extremity injury, low back pain or AKE lag less than 20°. After taking an informed written consent subjects were divided into 2 groups by using Simple random sampling method. Materials include foam roller, universal goniometer. Pre-intervention AKE test was taken. Group A received Post Isometric Relaxation and Group B received Foam Rolling technique for hamstring tightness. Post-intervention AKE test was taken immediately.

**Results:** Statistical analysis was done using SPSS version 16.0. Within group analysis was done by using Wilcoxon signed rank test and between groups analysis was done using Mann whitney U test. Both the interventions Post isometric relaxation and Foam rolling technique were found significant within group analysis. Between group analysis for Post isometric relaxation and Foam rolling technique showed insignificant result.

**Conclusion:** The present study concludes that Post isometric relaxation and Foam rolling technique are equally significant statistically and effective for hamstring tightness in clinical practice.

**Clinical implication:** Post isometric relaxation and foam rolling technique are equally effective for hamstring tightness, hence can be easily advocated into daily Physical therapy practice.

**Keywords:** Post isometric relaxation, Foam rolling, Hamstring tightness, AKE

### Introduction

Foam rolling breaks up the fibrous adhesions in the fascia, which enables the muscle to glide freely, thus improving range of motion <sup>[1]</sup>.

Post isometric relaxation refers to the effect of reduced tone experienced by a muscle/group of muscle, after brief periods of isometric relaxation <sup>[2]</sup>.

A lack in hamstring extensibility induces changes in lumbopelvic rhythm, causes hamstring strain or low back pain <sup>[3]</sup>.

### Aims and Objectives

1. To determine the immediate effect of Post isometric relaxation technique on hamstring tightness in collegiate students.
2. To determine the immediate effect of foam rolling on hamstring tightness in collegiate students.
3. To compare the immediate effect of post isometric relaxation versus foam rolling on hamstring tightness in collegiate students.

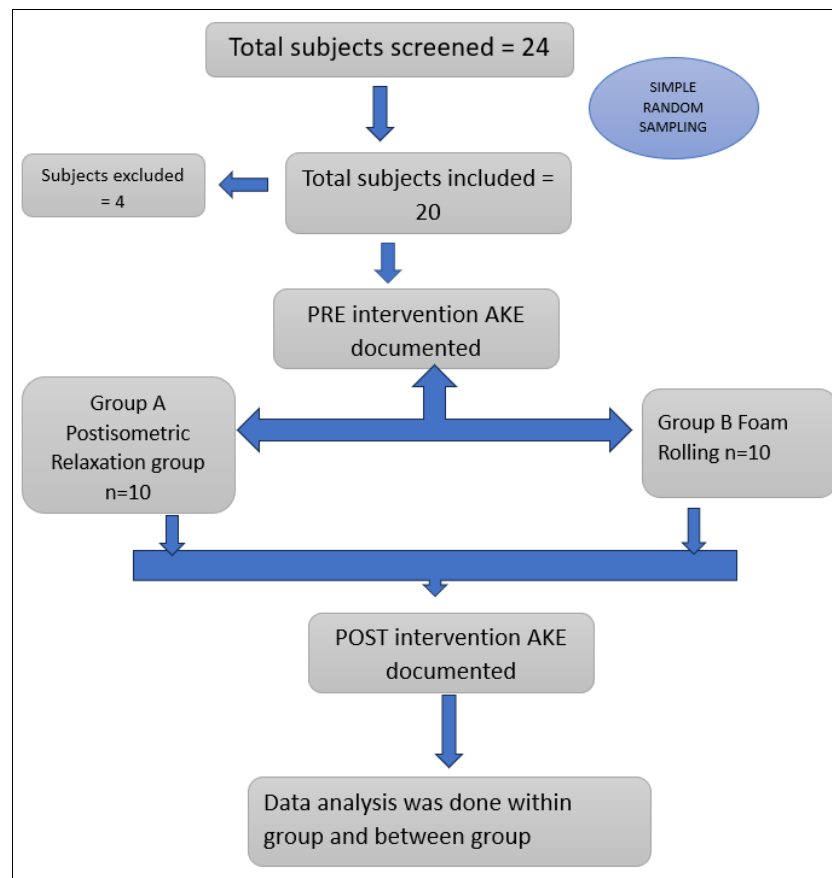
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**Method****Inclusion Criteria**

- Both male and female.
- Age group between 18-25 years.
- Subjects with a lack of AKE > 20 degrees.
- Subjects willing to participate.

**Exclusion Criteria**

- Recent lower extremity injury
- Low back pain
- Subjects with lack of AKE < 20 degrees

**Materials**

- Goniometer
- Plinth
- Foam roller (6\*12 inch)
- Pen and paper
- Consent form

**Group B:** Received Foam rolling on bilateral lower limbs for hamstring flexibility. Subjects were asked to roll the foam roller from beneath the ischial tuberosity to below knee; placing the hands on the floor which did not move during the rolling motion. The body shifted back and forth with the rolling motion. Foam rolling was performed for 30 sec on each side with 3 repetitions (10 sec of rest in between).



**Fig 1:** Foam rolling for hamstring

**Group A:** Received Post isometric relaxation on bilateral lower limbs for hamstring flexibility. Subjects lied supine with the treated hip flexed to 90 degrees and knee extended to the restriction barrier. The calf of the treated leg was placed on therapist's shoulder e.g. right leg on right shoulder. The subject was instructed to gently bend the knee against the counterforce given by the therapist's shoulder with 20-25% strength. Subjects were asked to inhale while slowly building up an isometric contraction and holding the breath for 7-10 sec during the contraction. Slowly contraction was ceased by releasing breath. Now take the slack to a new barrier and maintain a stretch for 30 sec with 3 successive repetition of the technique on each side (10 secs of rest in between).



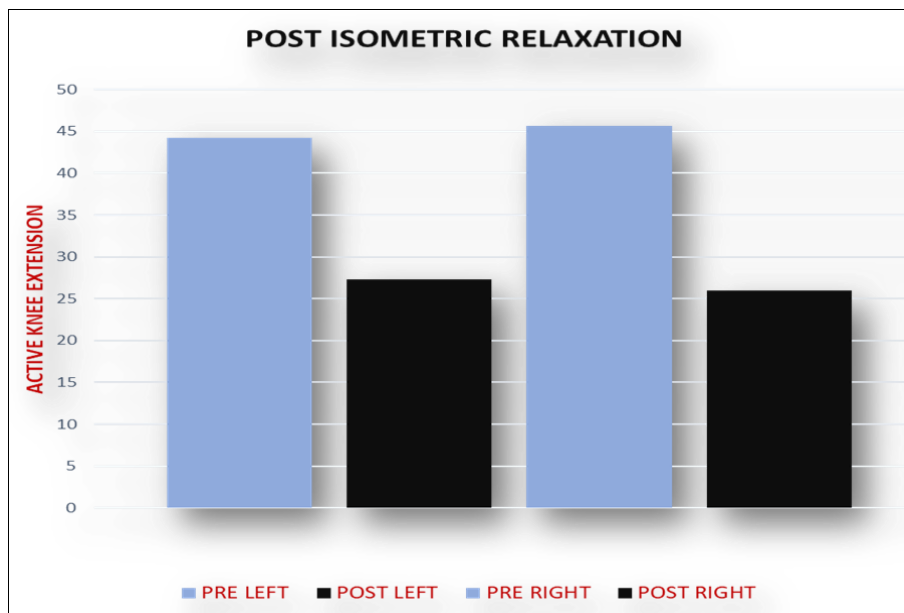
**Fig 2:** Post-isometric relaxation technique for hamstring

**Results**

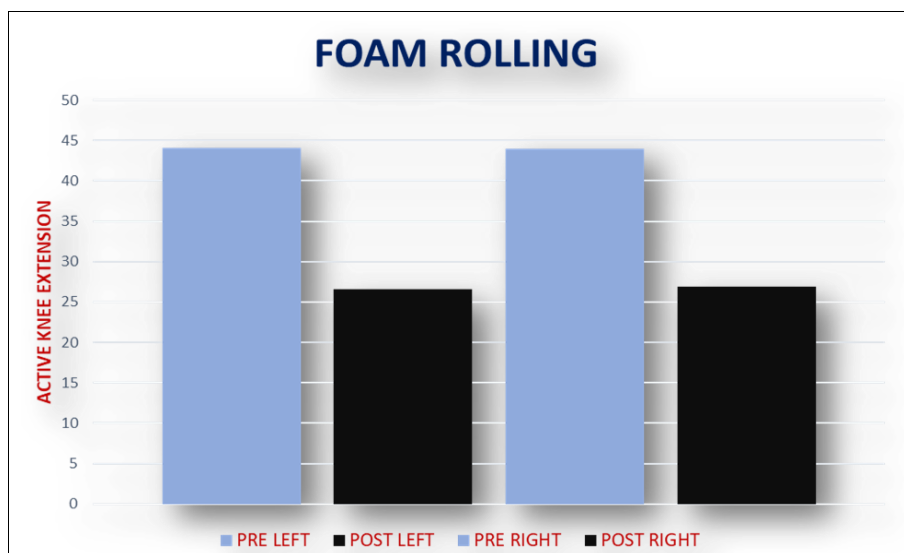
- Statistical Analysis was done using SPSS version 16.0.
- Data was not normally distributed.
- Baseline characteristics were matched with no statistical

significant difference.

- Within group analysis:** Wilcoxon Signed Rank Test.
- Between group analysis:** Mann Whitney U Test.



**Graph 1:** Post-isometric relaxation



**Graph 2:** Foam rolling

**Table 1:** Within group analysis

	Outcome measure (active knee Extension)	Pre value (Mean ± SD)	Post value (Mean ± SD)	P Value	Significance
Group A (PIR)	Left	44.2±4.68	27.3±7.118	0.004	Significant
	Right	45.7±8.05	26.0±9.07	0.004	
Group B(FR)	Left	44.1±8.58	26.6±9.84	0.004	Significant
	Right	44.0±8.05	26.9±8.91	0.005	

**Table 2:** Between group analysis

	Active knee extension	Group A (Mean ± SD)	Group B (Mean ± SD)	P Value	Significance
Difference of mean	Left	16.9±3.75	17.5±3.341	0.317	Insignificant
	Right	19.7±3.46	16.8±3.119	0.317	Insignificant

**Conclusion**

The present study concludes that Post isometric relaxation technique and Foam rolling are equally significant statistically on bilateral lower limbs and effective for hamstring flexibility in clinical practice. Further studies can include a comparative study of the effect of PIR vs FR on sprint time, Agility or Vertical jump performance in recreationally active individuals and Athletes.

**Clinical implication**

Flexibility is important physiological component of physical fitness and reduced flexibility CSN cause insufficiency at workplace and also being a risk factor for low back pain. PIR technique and Foam rolling are equally effective for hamstring flexibility, hence can easily be advocated into daily physical therapy practice. The study can also be further extended as a long duration study as well as on Athletic population.

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