

## A STUDY TO COMPARE RETRO-WALKING (BACKWARD WALKING) AND SUBOCCIPITAL MUSCLE INHIBITION TECHNIQUE IN HAMSTRING MUSCLE FLEXIBILITY IN COLLEGIATE STUDENTS: AN EXPERIMENTAL STUDY

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### ABSTRACT

**Background:** Tightness of hamstring is observed in a majority of the students. long duration sitting can be a contributory factor in hamstring tightness. Shortening of the hamstring has a negative impact on the posture of the pelvic region. The increase in stiffness of the hamstring may serve as a cause of low back pain and it is also a common characteristic of back pain patients. The increase in stiffness of the hamstring produces more burdens on the back and causes improper motion patterns in the lumbo-pelvic region.

**Methodology:** For the study Total number of 30 subjects were randomly taken from The School of Physiotherapy at R.K.University and assigned to either group -A [suboccipital inhibition] or group-B [retro -walking (backward walking)] and there was given a treatment for 5 day with one session per day.

**Result:** Data was analyzed by using SPSS software. For evaluation paired and unpaired T test used for analysis.

**Conclusion:** It can conclude that has both techniques where improve hamstring muscles flexibility suboccipital muscles inhibition technique is more effective than the retro walking technique.

**KEY WORDS:** Retro Walking (Backward Walking), Hamstring Flexibility, Suboccipital Muscle Inhibition, Hamstring Tightness.

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Access this Article online	Journal Information
<b>Quick Response code</b> 	<b>International Journal of Physiotherapy and Research</b> ISSN (E) 2321-1822   ISSN (P) 2321-8975 <a href="https://www.ijmhr.org/ijpr.html">https://www.ijmhr.org/ijpr.html</a> DOI-Prefix: <a href="https://dx.doi.org/10.16965/ijpr">https://dx.doi.org/10.16965/ijpr</a> 
	Article Information
	Received: 12 Mar 2019 Peer Review: 12 Mar 2019 Revised: None
	Accepted: 22 Apr 2019 Published (O): 11 Jun 2019 Published (P): 11 Jun 2019

DOI: 10.16965/ijpr.2019.126

### INTRODUCTION

Tight hamstrings can have profound effect on seated postural alignment of body and number of studies showed positive correlation between decreased hamstrings flexibility and low back pain of lumbar intervertebral disc pathology. Tight hamstring muscles increases the patell of emoral compressive force because of the increased passive resistance during the swing phase of ambulation and running. In addition hamstring cross over two joints when tight

muscle fails to pass through full physiological amplitude under rapid and stressful situations. This results in varying degree of muscle damage and ultimately various hamstring injuries [1]. The pattern of joint angle during backward walking was similar to the reversal of that of forward walking. Ask the patient to walk backward. Backward walking is a widely-used rehabilitation tool for improving strength and balance. Although, there are few experimental results and no generalized values of backward

walking compared with forward walking. Gait parameters of joint angle, joint moment, joint power, and ground reaction force (GRF) were defined and used to explain the gait mechanism. Gait mechanism was different between them by proving different patterns joint moments and powers. In the future, EMG data will be needed to analyze the muscle control [2].

The superficial back line (SBL) is a continuing line of fascia and muscle from head to heel which includes both the suboccipitals and the hamstrings. The SBL helps keep us upright and is connected by the one neural system. The very small suboccipital muscles have a link to the dura mater (the membrane enveloping brain and spinal cord) and because of this are often described as the control centre of the SBL having an effect on the movement of the muscles within the SBL, particularly the hamstring group. For the SMI technique, the subject is in supine lying, where as the therapist is seated at his/her head with the elbows resting on the surface of the table. The therapist placed both hands behind the head of the subject, with the palms facing upwards, the fingers flexed, and the finger pads positioned on the posterior arch of the atlas, to allow the occiput to rest in the palm of the hands. A force was applied with the finger pads over the atlas in the direction of the ceiling with slight traction in a cranial direction for 5 minutes [1].

Active knee extension (Popliteal angle) test has been demonstrated to be a reliable and accurate when using with hand held goniometer. Active knee extension (Popliteal angle) has advantage of being relatively simple to use particularly in clinical setting and is good measure of physiological range of motion [1].

This study was conducted to determine the relationship between two alternative tests for indicating hamstring musculotendinous length, active knee extension (AKE.) and active straight leg raise (ASLR). Before alternatives to a commonly practiced clinical test such as AKT can be recommended for application, their convergent validity should be established. The significant correlation between the measurements obtained using these two tests suggests that both are providing an indication of the same basic phenomenon, presumably hamstring

musculotendinous length, for this reason, the AKE test may be a useful alternative to the straight leg raise test for providing an indication of hamstring muscle length [3].

A number of investigations have tested the reliability of these measures, specially the active knee extension A number of investigations have tested the reliability of these measures, However, in most studies, the sample involved subjects with normal flexibility. Reliability is only assessed by the intraclass correlation coefficient (ICC), where other measures such as the standard error of measurement (SEM) or the minimal detectable difference (MDD) might give additional and more valuable information, especially from a clinical point of view. The purposes of this study are: a) to determine the test-retest reliability of the active knee extension and SLR; b) to examine how these two tests correlate with each other in the assessment of a population without injury but with flexibility deficits [4].

**AIM:** To find out relationship between retro - walking (backward walking) & suboccipital muscle inhibition in hamstring flexibility in collegiate student.

## OBJECTIVES

1. To assess suboccipital muscle inhibition effects in hamstring flexibility in collegiate student.
2. To assess retro - walking [ backward walking] effects in hamstring flexibility in collegiate student.
3. To Compare the suboccipital muscle inhibition and Retro - walking [ backward walking] effects in hamstring flexibility in collegiate student.

## MATERIALS AND METHODS

30 subjects were taken in this experimental study ageing from 15 to 25yrs. Among these included both male and female gender from various clinical setup. Convenient sampling was done and the subjects were informed about the goal of the study. Also, informed consents were taken from the subjects. They underwent general screening and then followed by the tests for inclusion criteria and exclusion criteria.

Also given knowledge about hamstring tightness. The purpose of the passive knee extension test is to examine the joint range, quality of movement and also measure the tightness of the hamstring muscle.

**Inclusion Criteria:** Age between 15 to 25yr, Collagen students having hamstring tightness, Male and female both subject are involved.

**Exclusion Criteria:** Any infection in knee joint, Osteoarthritis of knee joint, Subject having a history of the fracture, any pathology related to knee in the lower limb last one year, Non-consent subject.

The axis of the goniometer should be place at the lateral epicondyle of the femur. The moving arm should point towards the lateral malleolus and the stationary should point towards the greater trochanter [1].

Total number of the 30 subjects were randomly taken from the study and assigned to either group-A (suboccipitalinhibition) or group-B [retro walking(backward walking)]and they was given the treatment for five days with one session per day.

Group -A was treated by suboccipital inhibition and group-B was treated by retro walking [backward walking].

At the first day of pre test measurement was taken for range of motion of knee extension with hip flexion to check the flexibility of hamstring muscles. [90-90 knee extension test for measure the hamstring tightness].

**Group-A suboccipital muscle inhibition:** The hand of the therapist was placed behind the head of the subject with the palm facing upward and the finger flexed with the finger pads positioned on the posterior arch of the atlas. A force was applied on the atlas in the direction of the ceiling for a 5 minute. With a slight traction in a cranial direction [1].

**Group-B retro walking[backward walking]:**

Ask the subjects to walk backward 10 minutes for 5 days. In a first session individual were ask to walk for 5 minutes to know how retro walking was done.

The pattern of joint angle during backward walking was similar to the reversal of that of forward walking [3].

## RESULTS AND TABLES

**Statistical software:** All statistical analysis was done by Statistical package of social science (SPSS) statistics version 20.0 for windows software. Microsoft excels and word was used to generate graphs and tables. Mean was calculated as a measure of central tendency for active knee extension test strength value Standard Deviation (SD) was calculated as a measure of dispersion. Pre-treatment and Post-treatment data Active Knee Extension Test analysed by Paired T test and comparison between two groups of Active Knee Extension Test analyzed was analyzed by Unpaired T test.(Level of significance (pvalue) was set to 0.05.)

**Table 1:** Mean and SD of Pretreatment and Post Treatment calculated as a measure of dispersion. Pre-treatment and Post-treatment data Active Knee Extension Test analyzed of Group A and B

Group	Test	Treatment	Number of subjects	Mean	SD
A	Active Knee Extension Test	Pre treatment	15	128.67	7.898
		Post treatment	15	139.67	6.399
B	Active Knee Extension Test	Pre treatment	15	127.33	6.779
		Post treatment	15	135	7.792

**Interpretation:** The above table shows mean and SD of repost active knee extension test Group A and B. Paired T test was used for pre-treatment and post treatment comparison of Active Knee Extension Test analysed of Group A and Group B.

Group		T	P	Interpretation
A	Pre and post Active knee Extension test	-8.401	<0.05	Significant
B	Pre and post Active knee Extension test	-7.99	<0.05	Significant

Interpretation: The above table shows the result of paired T test. Result shows significant difference for pre & post Active Knee Extension Test analyzed of both the group.

Unpaired T test was used for between group comparison of Active Knee Extension Test analyzed of Group A and B.

Group		T	P	Interpretation
A and B	Pre - Pre	2.054	<0.05	Significant
	Post - Post	2.054	<0.05	Not Significant

Interpretation: The above table shows unpaired t test. Result shows no any significant changes

for repost measurement of both the group.

## DISCUSSION

In this study measure of the hamstring muscle found to be a most prevalent for the tightness in body limitations of knee extension. For flexibility of hamstring muscle & find the effect of two different techniques. We were taken 30 subjects for the study, divided in two groups 15 subject for retro-walking & 15 subjects for suboccipital muscle inhibition.

Mechanism of SBI (superficial back line): The present Study showed that both methods of produce significantly gain a range of motion on both group suggesting that both technique. The superficial back line (SBL) is a continuing line of fascia and muscle from head to heel which includes both the suboccipitals and the hamstrings. The SBL helps keep us upright and is connected by the one neural system. The very small suboccipital muscles have a link to the dura mater ( the membrane enveloping brain and spinal cord) and because of this are often described as the control center of the SBL having an effect on the movement of the muscles within the SBL, particularly the hamstring group. For the SMI technique, the subject is in supine lying , where as the therapist is seated at his/her head with the elbows resting on the surface of the table. The therapist placed both hands behind the head of the subject, with the palms facing upwards, the fingers flexed, and the finger pads positioned on the posterior arch of the atlas, to allow the occiput to rest in the palm of the hands .. A force was applied with the finger pads over the atlas in the direction of the ceiling with slight traction in a cranial direction for 5 minutes [2].

Mechanism of backward walking: The pattern of joint angle during backward walking was similar to the reversal of that of forward walking and ask the patient to walk backward.

Backward walking is a widely-used rehabilitation tool for improving strength and balance. Although, there are few experimental results and no generalized values of backward walking compared with forward walking.

Gait parameters of joint angle, joint moment, joint power, and ground reaction force (GRF) were defined and used to explain the gait

mechanism. Gait mechanism was different between them by proving different patterns joint moments and powers. In the future, EMG data will be needed to analyze the muscle control. In the loading response phase, the GRF was rapidly raised (F1) due to support the whole body weight. The knee joint was flexed during mid-stance, the force plate briefly unloaded and the GRF drops (F2) below the body weight . The second peak of GRF (F3) was smaller than first peak of GRF (F1), since the knee and hip joints were just lifted the limb and moved backwards. Thus, the plateau shape which is not able to be seen in normal gait was observed during pre-swing phase. EMG data will be needed to analyze the muscle control [3-6].

The SMI technique is a method of inducing relaxation of the fascia by applying soft pressure to the suboccipital area of the patient while he/she is lying comfortably, and it can be easily applied by a therapist. However, the disadvantage is that it cannot be done by patients themselves. On the other hand, self-myofascial release (SMFR) is a technique that can be applied at home or in the office by patients themselves, without any help from a therapist or limitations regarding time or space, and recently, the effect of SMFR using a foam roller on the hamstring has been studied.

However, most of the known research results have been for cases of applying MFR directly, and research in which SMFR was applied to the original part of the shortened area, such as the suboccipital muscles, has been rare.

Therefore, in this study, we applied the SMI and SMFP techniques to the suboccipital area of the short hamstring of subjects and compared the effects on the flexibility of the hamstring [7].

**Limitations of study:** Short follow up time, Only younger population, Majority of subject were women, Small sample size

**Further recommendation:** With long follow up time, Use of patients population, Further study can be performed in large numbers of subject.

## CONCLUSION

It can conclude that has both technique where improve hamstring muscles flexibility suboccipital muscles inhibition technique is more effective than the retro walking technique it give a

more range of motion than the retro walking.

## ACKNOWLEDGEMENTS

I would like to thank each and every participant in this study Also my parents & friends for their support.

**Conflicts of interest: None**

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**How to cite this article:** Bhakti Desai, Bhut Forum, Vora Shreeya, Grishma Maru, Kuldeep Nagvadiya, S. Bansi Parsaniya. A STUDY TO COMPARE RETRO-WALKING (BACKWARD WALKING) AND SUBOCCIPITAL MUSCLE INHIBITION TECHNIQUE IN HAMSTRING MUSCLE FLEXIBILITY IN COLLEGIATE STUDENTS: AN EXPERIMENTAL STUDY. *Int J Physiother Res* 2019;7(3):3085-3089. **DOI:** 10.16965/ijpr.2019.126