



A STUDY TO FIND OUT AN IMMEDIATE EFFECT OF BENT LEG RAISE TECHNIQUE IN SCHOOL GOING CHILDREN WITH HAMSTRING TIGHTNESS: AN EXPERIMENTAL STUDY

Physiotherapy

Dr. Sneha Chauhan	Assistant Professor, Department of Physiotherapy, Shri USB College of Physiotherapy, Abu Road, Rajasthan
Didhiti .P. Chudasama*	B.P.T Student, Department of Physiotherapy, Shri USB College of Physiotherapy, Abu Road, Rajasthan *Corresponding Author
Sweety Patel	B.P.T Student, Department of Physiotherapy, Shri USB College of Physiotherapy, Abu Road, Rajasthan

ABSTRACT

Context: The Bent leg raise (BLR) technique was given by Dr. Brian mulligan and is an excellent technique which is used to improve flexibility of hamstring muscle. The intention of this technique is to restore normal mobility and reduce physical impairment.

Aim: To find out an immediate effect of Bent Leg Raise (BLR) Technique in school going children with hamstring tightness

Setting and design: The experimental study was carried out in various primary schools of Abu road.

Method and material: BLR technique was given to 70 subjects, aged 5-12years. Also, the inclusion and exclusion criteria were taken into consideration.

Statistical analysis: Data was analyzed by using SPSS Version 20. Wilcoxon

signed-rank test was used for the pre treatment and post treatment comparison of active knee extension (AKE) within the group.

Results: Statistically there is significant ($p < 0.05$) effect of BLR technique in school going children with hamstring tightness.

Conclusion: There is significant effect of BLR technique in school going children with hamstring tightness. Therefore, BLR technique can be used with conventional techniques to improve hamstring flexibility in school going children.

KEYWORDS

Bent leg raise (BLR) technique, active knee extension (AKE), hamstring tightness.

INTRODUCTION

Muscle is a contractile tissue and is primarily designed for movements. The fundamental property is contractility which is developed in highly specialized form. They produce contractions that move body parts including internal organs.¹ Muscular flexibility is an important aspect of normal human function. Limited flexibility has been shown to predispose a person to several musculoskeletal overuse injuries and significantly affect a person's level of function. Muscular tightness is frequently postulated as an intrinsic risk factor for the development of a muscle injury.²

Muscle tightness is caused by decrease in the ability of the muscle to deform, resulting in a decrease in the range of motion at the joint on which it acts. The term has also been used to denote a slight to moderate decrease in muscle length; usually the movement in the direction of the elongating muscle is limited. Muscle tightness usually results from inadequate or improper rehabilitation following sustained muscle injury or low levels of physical activity in individuals. It could make the musculotendinous unit more susceptible to injury, increase resistance to various anatomical structures, which may lead to overuse syndrome. It could also lead to some pathological conditions at the joint on which the muscle acts, especially on a muscle like the hamstrings which passes over two joints.³

The hamstrings comprise three large muscles, namely semi-tendinous, Semi-membranous and biceps femoris which originate from the inferomedial impression on the upper part of the Ischial tuberosity and gets inserted on the upperparts of posterior surface of tibia. They are located in the posterior compartment of the thigh and acts on the hip and knee joint. Hence, they are extensors of the hip and flexors of the knee.³ The peculiar characteristics of the hamstring muscle- bi-articular, made predominantly of type II fibers, and containing less titin protein—may put the muscle group at higher risk of strains.⁵ Hamstrings muscles are important contributors to the control of human movement and are involved in a wide range of activities from running and jumping to forward bending during sitting or standing and a range of postural control actions.⁶

Inability to extend the knee completely when the hip is flexed accompanied by discomfort or pain along the posterior thigh and/or knee is usually attributed to hamstring muscle tightness. Clinically, hamstring muscle length is not measured directly but instead, it is represented indirectly by angular measurements of unilateral hip flexion with the knee extended. Hamstring muscle tightness is defined

as Knee Extension Angle (KEA) greater than 20 degrees where KEA is the degree of knee flexion from terminal knee extension.³

GONIOMETER

The instrument, which is used for measuring the range of motion (ROM) of the joint, it's called as goniometer. (In Greek: Gonio: angle, metron: measurement).

To measure a ROM of a particular joint, the therapist should have a thorough knowledge on the ROM of an individual joint. Selection of goniometer is important factor while measuring the ROM of the joint. The universal goniometer is designed by Mr. Moore. This is the commonest variety having stationary arm, movable arm, and body. The body or axis of the goniometer is placed over the axis of the joint, which has to be measured. The stable arm does not have any motion and is placed over the proximal segment of the measuring joint. The movable arm is aligned with the distal segment of the measuring joint.⁷

ACTIVE KNEE EXTENSION TEST

For AKE test participants were positioned supine on a plinth so that the leg not being tested was flat on the plinth with the knee extended. A strap was placed over the mid-thigh of this leg to eliminate any elevation of the limb. An additional strap was positioned over the front of the participant's pelvis and around the plinth to maintain the pelvis in a neutral position during hamstring measurements. With the foot in neutral position and the knee flexed at 90°, a standard universal goniometer was placed over the lateral femoral condyle, with 1 arm aligned along the thigh in direction to the greater trochanter and the other arm aligned over the leg in the direction of the lateral malleolus. From this position, subjects were instructed to extend the knee until they felt a strong resistance, holding this final position for 2 to 3 seconds to allow the goniometric reading. The result recorded corresponded to the amplitude, in degrees, of the knee-extension movement, starting from the initial test position (knee flexed at 90° which corresponded to the goniometric 0°).⁸

NEED OF THE STUDY

There are many ways of reducing hamstring tightness but very few techniques give an immediate result. Bent leg raise technique is a mulligan technique which is convenient, quick, simple and easy to apply in school going children.

There has been a study to find out an immediate effect of mulligan's bent leg raise technique. However, there was a paucity to find out its effect on school going children with hamstring tightness.

So, this study is an effort to find out the immediate effects of BLR technique in school going children to improve the hamstring flexibility and also the joint range of motion.

AIM OF THE STUDY

The aim of the study was to find out an immediate effect of bent leg raise technique in school going children with hamstring tightness.

OBJECTIVE OF THE STUDY

- To assess the pre BLR technique in school going children with hamstring tightness
- To assess the post BLR technique in school going children with hamstring tightness.
- To assess the difference between pre and post BLR technique in school going children with hamstring tightness.

HYPOTHESIS

- NULL HYPOTHESIS:** Bent leg raise technique is not an effective technique in reducing hamstring tightness in school going children.
- EXPERIMENTAL HYPOTHESIS:** Bent leg raise technique is an effective technique in reducing hamstring tightness in school going children.

MATERIAL AND METHODOLOGY

STUDY SETTINGS: Shri U.S.B. College of Physiotherapy, Abu Road

SOURCE OF DATA: Various primary schools in Abu Road.

METHOD OF DATA COLLECTION:

STUDY POPULATION: School going children with hamstring tightness

SAMPLE SIZE: 70 Students

SAMPLING METHOD: Purposive sampling

STUDY DESIGN: An Experimental study

MATERIAL

- Couch
- Foam mattress
- Goniometer
- Inch tape
- Weighing machine
- Straps (for stabilization)
- Stop watch
- Consent form
- Assessment form
- Pen and paper

CRITERIA FOR SELECTION

INCLUSION CRITERIA:

- Age: 5-12 years children
- Gender: Both (male and female)
- Normal child.
- Hamstring tightness (Minimum degree < 155 degrees)

EXCLUSION CRITERIA:

- Regular sports player
- Hamstring tear
- Past pathology
- Post fracture of lower limb
- History of spinal cord injury
- History of low back pain

MEASUREMENT PROCEDURE

After the approval of the study from the ethical committee, 70 subjects from various schools of Abu road, who fulfilled the inclusion and exclusion criteria were taken for the study purpose. Written informed consent was signed by the class teacher of each subject before proceeding for the study procedure. Before starting the study a brief assessment was taken. Class teachers and subjects were explained about the test and procedure to be conducted. Total 70 subjects with tight hamstrings were selected.

Before data collection procedure begun, each subject received a verbal explanation and a demonstration of the movement to be performed and practice trials were performed by them.

For subjects to fit in inclusion criteria AKE test was performed whose minimum degree was taken as 160°.

BENT LEG RAISE TECHNIQUE

Position of the subject: Supine lying on the plinth. Hips 90° flexed, knees 90° flexed and the affected limb on researcher's shoulder.

Position of the researcher: Walk standing.

Hand placement: Grasp the lower end of femur, thumbs at popliteal fossa and fingers in front.

Subject place his flexed knee over the shoulder of therapist. Ask him to push therapist away with his leg and then relax. At this point therapist push his bent knee up as far as therapist can in the direction of his shoulder on the same side provided there is no pain. 3 repetitions of pain free 5s, isometric contraction of the hamstring performed in five progressively greater position of hip flexion. With the bent knee over the therapist shoulder therapist include a traction component with this technique.⁹

RESULT

Data was analyzed by SPSS version 20. Wilcoxon signed rank test was used to find out the effect of BLR technique in 70 (male:40 female:30) school going children with hamstring tightness. In this test the Z value is -7.27 and level of significance is 0.000 which is less than 0.05

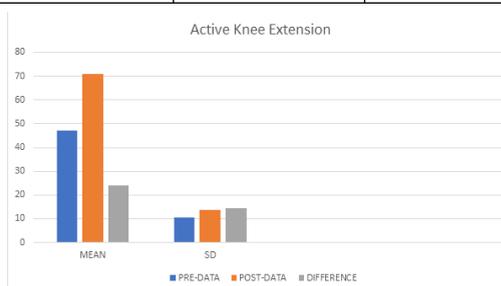
TABLE 1: Gender distribution

	FREQUENCY
MALE	40
FEMALE	30
TOTAL	70

Interpretation: Table 1 shows gender distribution.

TABLE 2: Intra-group comparison of mean and SD of pre-data, post-data and difference. Mean and SD of age.

	MEAN	SD
AGE	7.25	±1.41
PRE-DATA	47.07	±10.63
POST-DATA	71.06	±13.84
DIFFERENCE	23.99	±14.58



GRAPH 1: Intra-group comparison of mean and SD of pre-data, post-data and difference.

Interpretation: The above table 2 and the graph 1 shows the result of Wilcoxon sign rank test which shows there was significant difference between the pre and post AKE. ($p < 0.05$).

TABLE 3: Intra-group comparison and significance of post BLR technique on AKE

	Z	P
AKE	-7.27	0.00

Interpretation: The above table 3 shows the result of Wilcoxon sign rank test which shows there was significant difference between the pre and post AKE.

DISCUSSION

The intent of the study was to find out an immediate effect of bent leg raise technique in school going children with hamstring tightness.

the present study, the values of pre-treatment and post-treatment BLR technique was analyzed and it was proved statistically significant.

Hamstring tightness increases from early childhood and with

advancing age other contributing factors like lack of physical activity, prolonged sitting also plays an important role in decreased hamstring flexibility.

It was found that there was marked increase in the joint range of motion after applying BLR technique which stated significant outcome.

1. Dr. Sejal Sathe et al, (2018) conducted a study to compare the effectiveness of BLR technique and traction SLR on hamstring flexibility in young individual and concluded that BLR technique is more effective than traction SLR to increase hamstring flexibility.⁶

2. Tejashree bhoir et al, (2016) conducted a study to find out an immediate effect of BLR technique versus self myofascial release (MFR) on hamstring tightness in young adults and concluded that both BLR technique and self MFR were equally effective in improving hamstring flexibility.²

3. Vinod Babu et al, (2015) conducted a study to find immediate effect of neurodynamic sliding technique (NDST) versus mulligan BLR technique on hamstring flexibility in asymptomatic individuals and concluded that both NDST and BLR technique are equally effective in improving hamstring flexibility.⁹

4. Deepak Raghav et al, (2014) conducted a study to find out the effect of BLR technique in subjects with hamstring trigger point and concluded that BLR technique is effective in decreasing pain and improving joint range of motion in subjects with hamstring trigger point.⁵

CLINICAL IMPLICATIONS

Results suggest that the bent leg raise technique is proved to be effective in improving the hamstring flexibility and also the range of motion of the joint.

LIMITATIONS

- Subjects with 5-12 years of age were considered for study thus results cannot be generalized to all age group.
- Only immediate effect was studied, short and long term effects were not studied that would have helped to find the maintenance of the improved outcome measures.
- Only AKE ROM was measured.
- Study was done only on normal subjects.

FURTHER RECOMMENDATIONS

- Further study on other techniques in combination with BLR needed to find the effect for individual with limited hamstring flexibility.
- Further study are needed to find the effects of this techniques in conditions with secondary hamstring tightness.
- Further study can use other outcome measurements.
- Further study can be done with larger sample size.

CONCLUSION

There is significant effect of Bent leg raise technique in school going children with hamstring tightness. Therefore, it can be used with conventional treatments to improve hamstring flexibility in school going children.

Conflict of Interest: Nil.

Source of Fund: No fund was needed.

Ethical Clearance: From Shri USB College of Physiotherapy, Abu road.

REFERENCES

1. Shobha Rawlani, Shivlal Rawlani. Textbook Of General Anatomy, Jaypee Brothers Medical Publishers, 2nd Edition, Chapter 6, (102)
2. Tejashree Bhoir, Deepak B. Anap, Immediate Effect Of Mulligan Bent Leg Raise Technique Versus Self Myofascial Release On Hamstring Tightness In Young Adults-A Randomized Control Trial, Indian Journal Of Physical Therapy, Volume 4 Issue 1 (January-June 2016) (47)
3. Nishchal Ratna Shakya*, Sajan Manandhar, Prevalence Of Hamstring Muscle Tightness Among Undergraduate Physiotherapy Students Of Nepal Using Passive Knee Extension Angle Test, International Journal Of Scientific And Research Publications, Volume 8, Issue 1, January 2018 (182)
4. Akinpelu Ao, Bakare U, Adegoke Boa, Influence Of Age On Hamstring Tightness In Apparently Healthy Nigerians, Journal Of The Nigeria Society Of Physiotherapy-Volume-15 No.2 (2005), (35)
5. Deepak Raghav, Vinit Kumar Singh, Meenakshi Verma, Monika Sharma, Effect Of Mulligan Bent Leg Raise Technique In Subject With Hamstring Trigger Point, Iosr Journal Of Dental And Medical Sciences (iosr-jdms), Volume-13, Issue-1 Ver.6 (jan-2014) (48)

6. Dr. Sejal Sathe, Dr. Gauri M Afle, To Compare The Effectiveness Of Mulligan's Bent Leg Raise And Traction Straight Leg Raise On Hamstring Flexibility In Young Individuals, International Journal Of Yoga, Physiotherapy And Physical Education, Volume 3; Issue 3; May 2018; (30)
7. S. Lakshmi Narayanan, Textbook Of Therapeutic Exercises, Jaypee Brothers Medical Publishers, 1st Edition-2005, (40)
8. Elise Shepherd, Sara Winter And Sue Gordon, Comparing Hamstring Muscle Length Measurements Of The Traditional Active Knee Extension Test And A Functional Hamstring Flexibility Test, Journal Of Physiotherapy & Physical Rehabilitation Shepherd Et Al., Physiotherapy Rehabilitation 2017, 2:1 Doi: 10.4172/2573-0312.1000125
9. Vinod Babu, Akshata Akalwadi, Sai Kumar N, Unadkat Mona Mahendrabhai, Immediate Effect Of Neurodynamic Sliding Technique Versus Mulligan Bent Leg Raise Technique On Hamstring Flexibility In Asymptomatic Individuals, International Journal Of Physiotherapy. Volume-2 (4), August (2015) (661).