

Effectiveness of Mulligans SLR to Improve Hamstring Flexibility in Young Female College Students

Mobility and Increasing Performance in Young Female Students Using Mulligans SLR

Dr. Poorani Panneerselvam¹; Dr. Muthukrishnan P.²

^{1,2}Assistant Professor; Faculty of Physiotherapy, Sri Venkateswara University.

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Abstract: Everyday students spend more time by sitting. This lifestyle causes tightness in hamstring muscles. This tightness in hamstring muscles can cause low backpain, knee pain and changes in the pelvis movement. The quick physical therapy method Mulligan's Straight leg raise gives a gentle pulling force to maintain proper movement and muscle flexibility. Need to prove that this technique effective in inactive young women

Keywords: Secondary Lifestyle; Mulligan's SLR; Hamstring Tightness; Hamstring Flexibility; Manual Therapy; Female College Students.

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I. INTRODUCTION

Four muscles named semitendinosus, semimembranosus, short and longhead of biceps femoris that are located in back of the thigh is called Hamstring Muscles. Extension of hip and flexion of knee is done with the help of this muscle. The physical performance of the person will drop down because of this muscle tightness.

Now a days in digital lifestyle the students were sitting for a prolonged timing with computers or mobile phones, because of this day to-day activity their muscle will become tight and difference in posture. If muscles get tight the changes in the alignment of hip and pelvic bone which leads to posterior pelvic tilt which causes low back ache, knee and foot discomfort.

These problems can be treated by giving ice pack massage, stretching etc. Mulligans SLR is a part of the manual therapy introduced by the Brian R. Mulligan. He approached the Mulligan Straight Leg Raise to enhance flexibility in hamstring muscles.

However, there are many researches done for this Mulligans SLR in sciatica, low backpain etc. Further studies taken for healthy young female students. This study shows that the flexibility increases in a single session for the female

college students who suffered from the hamstring tightness without any medical issues.

➤ Aim and Need of the Study

• Aim:

To improve hamstring muscle flexibility in a single session of Mulligan SLR in young female college students measured immediately after the session, evening of the session completed and the 72 hours completed.

• Need:

Stretches can elongate the muscle length in practice daily. But in Mulligans SLR in manual therapy can give an enhancement in flexibility in Hamstring Muscles in a single session and to assess this flexibility long how many days for a young college female student.

II. REVIEW OF LITERATURE

- Butler (1991) and Elvey and Hall (1997) postulated that rapid improvements in the straight leg raise following manual therapy are likely mediated by the gentle mobilization and decompression of hypersensitive neural pathways, mechanically mirroring the effects of a neural sliding technique.

- Goeken and Hof (1994) demonstrated that post-stretching increases in straight leg raise range of motion are primarily driven by enhanced hip excursion, pelvic rotation, and muscle relaxation, rather than immediate structural alterations within the muscular tissue itself.
- Investigations by Clark et al. (1999) confirmed that specific professional manual therapy interventions successfully expand straight leg raise parameters, thereby facilitating improved functional movement.
- Hall et al. (2001) demonstrated that Mulligan's Straight Leg Raise (SLR) with traction technique is highly effective in significantly increasing total lower extremity range of motion in individuals presenting with severe hamstring hypertonicity or stiffness.
- Beyerlein et al. (2002) demonstrated that targeted therapeutic exercises designed to increase straight leg raise range of motion significantly mitigate lower extremity impairment and alleviate discomfort in individuals presenting with lumbar spine dysfunctions.
- Alter (2004) established that the passive knee extension test provides a highly accurate, isolated measurement of hamstring length without inducing secondary biomechanical strain on neighbouring joints.
- Hall et al. (2006) observed that integrating a gentle traction force during a straight leg raise intervention effectively restores physiological movement patterns. Furthermore, the authors noted that expanding this range of motion directly correlates with a reduction in both lumbar pain severity and localized joint stiffness.
- Bellew et al. (2010) demonstrated that hamstring flexibility directly influences pelvic rotation, noting that increased extensibility permits unrestricted trunk flexion while reducing the risk of compensatory low back injury.

III. DESIGN AND METHODOLOGY

Research Design is Quasi Experimental study.

➤ Selection of Criteria:

- **Inclusion:**
 - ✓ At the age from 18 to 25 years old college students
 - ✓ Selected subjects were only female
 - ✓ Subjects with the positive sign of hamstring muscle tightness
 - ✓ Subjects with fully consented to support the research.
- **Exclusion:**
 - ✓ Samples with Sciatica or disc problems were excluded.
 - ✓ Anyone with fractures, any recent surgeries and injuries.
 - ✓ Actively participating sports heavy athlete gym people were excluded

- ✓ People who were psychologically and medically not fit.

➤ Population and Sample

• Population:

The group of young female college students were met and get the knowledge and instructions about the research.

• Sample:

To make the data collection fair simple random sampling technique is used to choose 20 college students as a sample.

➤ Study Variable

- Mulligans Straight Leg Raise Technique is used as a Independent variable.
- Hamstring Flexibility is measured with knee extension is set as a dependent variable.

➤ Testing Tools And Accuracy

Joint angles were measured with universal goniometer to test the Passive Knee Extension Test to asses the hamstring flexibility. Tool is highly valuable and reliable to measure the range of motion of joint which is widely trusted by the clinicians.

➤ Intervention Procedure

Before starting the assessment the clear explanations were given to 20 female students. After that everyone goes under pre-test to asses the hamstring flexibility.

➤ Pretest Measurements

- **Student Position:** Supine lying position
- **Therapist Position:** Walk Standing position

Therapist keep the joints (hip & knee) in 90° so that the joint will be in neutral line. In lateral intercondylar area of the knee joint, goniometer's centre point of the fulcrum is placed by the therapist. While the steady arm is pointing along with the femur bone. Then the moving arm will placed in the fibula. The therapist take the measurements by doing passive extension with goniometer until the students gets discomfort where there is missing in full extension due to the tightness the angle is measured for the pretest score.

➤ Application of Mulligan's SLR

Subjects were asked to be in a supine lying therapist stood in walk standing position by the side of the couch. Therapist gently place the subject's ankle in his/her arm and applied a force to keep the joint angle in the natural line to keep the knee joint straightly, with that force the therapist straightly raise the leg of the student until stretches feel the student discomfort. The position hold for 7 seconds exactly. Then back to the supine position normally and rest for upto 5 seconds. Then the same technique is applied and repeated as it is 3 times in a single session.

➤ *Post Test Measurements*

The same procedure repeated as like measurements taken in pretest with three intervals that is:

- Ist measurements immediately after the session completed.
- IInd measurement in evening of same day.

- IIIrd measurements 72 hours (3 days) completed after the session.

IV. OBSERVATION & ANALYSIS

The three values were collected. Paired t test is used for checking for the quasi Experimental group.

Table 1 Paired 'T' Test Values of Experimental Group Immediately after Treatment

Variable	t – cal value	t – tab value for 9 degrees of freedom at 5% level of significance
Hamstring flexibility	9.391	2.262

- 't' calculated value was found to be 9.391. The 't' table value for 9 degrees of freedom at 5% level of significance was 2.262.
- 't' calculated value was compared with 't' table value.
- 't' calculated value was found to be greater than 't' table value.

Hence there is a significant improvement in flexibility of hamstrings following Mulligan's SLR for Experimental Group immediately after treatment.

Table 2 Paired 'T' Test Values of Experimental Group after 6 Hours

Variable	t – cal value	t – tab value for 9 degrees of freedom at 5% level of significance
Hamstring flexibility	1.052	2.262

- 't' calculated value was found to be 1.052. The 't' table value for 9 degrees of freedom at 5% level of significance was 2.262.
- 't' calculated value was compared with 't' table value.
- 't' calculated value was found to be lesser than 't' table value.

Hence there is no significant decrease in flexibility of hamstrings following Mulligan's SLR for Experimental Group after 6 Hours.

Table 3 Paired 'T' Test Values of Experimental Group after 7 Days

Variable	t – cal value	t – tab value for 9 degrees of freedom at 5% level of significance
Hamstring flexibility	1.058	2.262

- 't' calculated value was found to be 1.058. The 't' table value for 9 degrees of freedom at 5% level of significance was 2.262.
- 't' calculated value was compared with 't' table value.
- 't' calculated value was found to be lesser than 't' table value.

Hence there is no significant decrease in flexibility of hamstrings following Mulligan's SLR for Experimental Group after 7 days.

Golgi tendon organs are activated during large amplitude movement such as straight leg raise. This processing of information in nervous system may inhibit the activity of the muscles being lengthened during SLR by damping the afferent activity of type II muscles spindles or by decre of motor neuron excitability via I-b fibres.

Hence Mulligans Straight Leg Raise Technique showed improvement in Hamstring Flexibility.

V. RESULTS & DISCUSSION➤ *Results:*

By analysing the statistical data the technique Mulligan's SLR shows the significant difference. Improvement in Hamstring flexibility.

➤ *Discussion:*

The improving flexibility in hamstring muscles because of Mulligan's Straight leg raise technique might be by the following reasons.

Golgi tendon organs around the knee hip and spine probably initiates various segmental reflex pathway during traction of the limb.

- *Human Subjects* :Consent access and open for treatment and publications was obtained .
- *Animal Subjects* : This confirmed that this study is not involve any animal subjects or tissue.
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DISCLOSURES

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APPENDIX
EXPERIMENTAL GROUP MULLIGANS SLR HAMSTRING MUSCLE

S.no	Pre-Test Scores	Post -test Scores-I	Post -test Scores-II	Post -test Scores-III
1	19	8	10	11
2	15	10	10	10
3	12	8	7	5
4	14	10	9	8
5	15	5	5	4
6	18	10	10	10
7	15	10	10	10
8	16	9	9	9
9	15	5	4	4
10	14	6	7	7