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Effectiveness of mulligan bent leg raise technique for hamstring tightness in physiotherapy students

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Abstract
Background and Purpose : Maintaining normal muscle length requires regular stretching to prevent muscle stiffness, decreases risk of musculoskeletal injuries and enhance physical performance. Muscle tightness is caused by the decrease in the ability of the muscle to deform, resulting in the decrease in the range of motion at the joint on which it acts. Tight hamstrings muscles places increased stress on the low back and aggravate back pain. Reduced extensibility resulting from increased hamstring tightness in the stiffness could be a possible contributing factor in low back injuries. Tight hamstring muscles, because of their attachment to the posterior leg and to the Is chial tuberosity may limit hip flexion Range of motion, leading to limited straight leg raise (SLR). So, improving the flexibility of the hamstring muscles should a major concern.
Method: Study involved 60 participants which were assessed by using the goniometer for Range of motion for hip flexion before giving the bent leg raise technique and after the technique respectively.
Result: The result of this study showed that Mulligan Bent leg raise technique was highly significant and there was an increase in the SLR (straight leg raise) after a single intervention
Discussion and Conclusion: The result showed that that Mulligan Bent leg raise technique was highly significant and is effective in improving the flexibility of the hamstring muscles.

Keywords: flexibility, hamstrings tightness, mulligan bent leg raise technique

1. Introduction

Muscular flexibility is an important aspect of normal human function [1]. Muscles must have enough flexibility or “stretchiness”. According to the American Council on Exercise (ACE), flexibility is defined as "the range of motion of a given joint or group of joints or the level of tissue extensibility that a muscle group possesses." Flexibility is necessary for normal activities that require bending, twisting and reaching. With poor flexibility a person is more prone to several musculoskeletal overuse injuries and significantly affects a person’s function [1] Hamstrings muscles places increased stress on the low back and aggravates back pain. Reduced extensibility resulting from increased hamstring tightness in the stiffness could be a possible contributing factor in low back injuries [2].

In human anatomy, the muscles of the back of the thigh are called hamstrings muscles. These thigh muscles in between the hip and the knee namely from medial to lateral are semimembranosus, semitendinosus and biceps femoris the hamstring is the single large tendon found behind the knee or comparable area in quadruped. Origin of the hamstring muscles is from the ischial tuberosity and they insert into into the knee joint over the tibia or in the fibula. The innervation of the hamstring group of muscles is by the tibial branch of the sciatic nerve. They participate in the flexion of the knee joint and extension of the hip joint [3]. Considering that forward bending is the most common movement in daily activities, shortened hamstrings may increase the risk of injury to the spine from mechanical stresses.

Muscle tightness is caused by the decrease in the ability of the muscle to deform, resulting in the decrease in the range of motion at the joint on which it acts. It leads to decrease in the performance level of a person in day to day activities. Inability to achieve greater than 160 degree of knee extension with the hip at 90 degree of flexion is considered as hamstring tightness [4]. The position of the pelvis, alignment of the spine, and the length of the muscle attaching to the spine contributes to the development of LBP. The short hamstrings must be corrected to correct the faulty alignment. Many of the tasks that occur during either work or everyday activities require trunk flexion. Forward bending is a complex movement of combined lumbar and hip motion. When the hamstrings are tight, they pull on the hip bone causing a slight rotation, which can affect the natural curvature of the back and cause pain and tightness in the lower back [5]. Tight hamstring muscles, because of their attachment to the posterior leg and to the ischial tuberosity may limit hip flexion ROM, leading to limited straight leg raise (SLR).

Tightness could also lead to pathological conditions at the joint on which the muscle acts, especially on a muscle like hamstring which passes over two joints. Muscle tightness affects the normal length tension relationships. When one muscle in a force couple becomes tight or hypertonic, it alters the normal arthrokinematics of the involved joint. (6) The more the tightness, the higher the severity of low back pain.

Limited straight leg raise (SLR) or painful SLR can be treated using the mulligan bend leg raise (BLR). It is also used in order to improve flexibility of hamstring in clients with tight hamstrings and subjects with low back pain or low back pain associated with radiating pain. To restore the normal mobility

of patients with LBP and reduce pain and physical impairment is the intention of the technique. It stretches the lower extremity muscles in combination of hamstring, hip adductors and hip rotators. Mulligan bent leg raise technique can be applied on patients who has painful straight leg raising or limited straight leg raise. It can be tried with patients who have a gross bilateral limitation of straight leg raise (SLR) [1].

2. Methodology

The study was conducted among physiotherapy students of Dr. A.P.J. Abdul Kalam college of physiotherapy, Pravara institute of medical sciences, Loni, in the age group 17-25 years. All the participants were explained about the study, benefits and hazards. Then informed written consent was obtained from the participants regarding the procedure prior to the study. The subjects were screened, according to their hip flexion below 60 degree and after finding their suitability according to the inclusion and exclusion criteria, they were requested to participate in the study. An assessment on the parameter of SLR for hamstring tightness was done prior to the technique and was compared after giving a single intervention of the bent leg raise technique.

3. Results

Sixty participants (n=60) were evaluated using Goniometer. Data for each participant was collected and recorded by the principal investigator. A single intervention of the bent leg raise technique was given to the participants. Participants were evaluated after the intervention. The result of this study showed that Mulligan Bent leg raise technique was highly significant and there was an increase in the SLR (straight leg raise) after a single intervention and is effective in improving the flexibility of the hamstring muscles. Comparison of mean in pre and post intervention shows t value 15.208 and p value <0.0001 which is extremely significant.

Mean values of pre and post intervention

Table 1

Mean ±SD		't' value	'p' value	Result
Pre	Post			
47.13±6.53	65.3±6.55	15.208	<0.0001	Extremely Significant

Comparison of mean in pre and post intervention

4. Discussion

The present study demonstrated that the Mulligan bent leg raise increases immediate post-intervention hamstring flexibility. Mulligan bent leg raise technique releases the scar tissues adhesions to allow the lengthening of the muscle and to regain flexibility for functional use.

Sciatic nerve passes through gluteus maximus and adductor magnus at hip level and this technique might release the adhesion between them. Stretching of the gluteus maximus and adductor magnus helps in breaking the adhesions between these muscles and sciatic nerve. Hence, mobilization of sciatic nerve will occur in relation to these muscles without the nerve getting stretched. It may also help in opening of the facet joints and the intervertebral foramen of lumbar spine as during the end range pelvis goes into posterior tilt. This might also help in stretching and releasing the thoracolumbar fascia. Improvement of the SLR (straight leg raise), by the BLR technique, might be due to the mobilization of the painful, sensitized, nerve tissues. Another beneficial effect of the bent leg raise technique might be a change in the stretch tolerance of the hamstrings. Increased range of the SLR, is mediated via an increase in the hip flexion and hamstring length.

Hamstring tightness is common in normal individuals because of immobilization of a tissue in a shortened position which results adaptive shortening. As the muscle shortens, its elasticity of the normal tissue is decreased and a change in the length tension relationship of the muscle, loss of flexibility also occurs.. Tight hamstring accompany virtually all cases of low back pain. The constant pull of these tight muscles tends to pull your pelvis in backward tilt. The natural lumbar curve can changes when this happens leading to a flat back posture. Bent leg raise technique can be used to restore the normal mobility of patients with low back pain and reduce pain and physical impairment.

As seen in the present study, Mulligan bent leg raise technique can be a useful intervention for patients with back pain and tight hamstrings and to improve the flexibility of hamstrings and increase the range of straight leg raise.

5. Conclusion

The present study concluded that Mulligan bent leg raise (BLR) is significantly effective in improving the range of straight leg raise (SLR) and to improve the flexibility of the hamstring muscles.

6. References

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