

Efficacy of Mulligan bent leg raise technique on neurophysiologic response in lumbar radiculopathy with radiating pain up to knee joint – A case study

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ABSTRACT

Purpose. Present study describe the case of lumbar radiculopathy with radiating pain up to knee joint managed with Mulligan bent leg raise (BLR) technique.

Case presentation. Total six intervention sessions were carried out over two consecutive weeks, three times per week. Three repetitions of BLR techniques with 5-10 seconds of sustained stretch with one minute rest between each repetition were given on first visit. On consecutive visits six repetitions were delivered in pain free zone. Study outcomes were measured by using straight leg raise (SLR) range of motion and “visual analog scale (VAS)” for back and leg pain. After two weeks of interventions, range of motion of SLR was increased from 45° to 56° while VAS score improve by 3 points both in back and radiating thigh pain.

Conclusions. Mulligan BLR technique resulted in reduction in back and radiating thigh pain as well as increase in range of SLR. Therefore, Mulligan BLR technique can be used a first line of treatment in lumbar radiculopathy with radiating pain up to knee joint.

Keywords: low back pain, manual therapy, physical therapy, physiotherapy techniques

INTRODUCTION

Lower back pain is an ailment that affect global, having incidence rate of 84% that putting burden on society [1,2]. The lifetime prevalence of lower back-discomfort in India is 60-85% [3,4]. Lumbar radiculopathy is term used for radiating pain to lower extremity. One of the predisposing factor for lumbar radiculopathy with radiating pain up to knee joint is the lack of hamstring flexibility [5,6]. The hip-spine coordination or the lumbopelvic rhythm refers to the way during which the lumbar spine moves along with the pelvis and is influenced by the tightness of the hamstring muscle [7]. Additionally, it prevents the anterior pelvis tilt during forward bending of spine that results in tense, inflammatory muscles and ligaments in the lumbar area, which increases the compressive stresses on the lower back. Patients with lower back discomfort have a significant prevalence of tight hamstrings, according to research [8]. The aim of current research is to elaborate the successful

management of lumbar radiculopathy with radiating pain up to knee joint by BLR technique.

CASE PRESENTATION

A 40 year old female presenting with pain in lower back which is radiating down to right lower extremity. Patient has limitation of SLR 45°. The patient marks her back pain 6/10 and radiating posterior thigh pain on right side 5/10 of on VAS. The patient complained that her pain gets increase with leg raise and forward bending. The aggravating factors of pain reported by patient were lifting heavy weight, bending forward and sitting and standing continuously for long time and patient feels relieved while extension. Patient has no history of surgeries or any trauma.

Outcome measure

Study outcomes were addressed for pain and range of motion on VAS and SLR respectively. Study

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variables were assessed before intervention and after intervention for two weeks.

Examination and diagnosis

Physical examination reveals that patient has positive SLR at 45° on right side. Pain radiates in posterior thigh up to knee but no symptoms below the knee joint. Loss of sensation was present over the posterior thigh area. The diagnosis was lumbar radiculopathy with radiating pain up to knee joint associated with hamstring tightness.

Treatment

Treatment protocol includes total six sessions over two weeks. Treatment delivered includes Mulligan BLR technique, three repetitions on first visit and six repetitions in subsequent sessions. Outcome measures were assessed at baseline, after 1 week and after 2 weeks intervention (Table 1).

TABLE 1. Outcome measures at different levels of protocol

	1 st WEEK		2 nd WEEK
	Pre-Intervention	Post-Intervention	Post-Intervention
SLR	45°	50°	56°
VAS (Back Pain)	6	5	3
VAS (Thigh Pain)	5	3	2

Bent Leg Raise (BLR) technique

The patient was lying in supine position on treatment table while therapist stands on affected side. The treated side's hip and knee were bent at 90°. The patient's popliteal fossa was lying on the therapist's shoulder as their flexed leg was placed over their shoulder. Femur's lower end was subjected to a distraction before the patient was instructed to push the therapist's shoulder with her leg before relaxing. In a pain-free available range, the therapist raised the bent knee as high as she could toward the shoulder on affected side. After holding the stretch for 5–10 seconds, it was released for a minute. The opposing lower limb was kept untense and free to move naturally. The position was kept for 10 seconds at end position before the lower limb was returned to its starting position. Throughout entire procedure, traction was maintained (Figure 1). On first visit, three repetitions with one minute rest between each repetition. On subsequent visits six repetitions were delivered.



FIGURE 1. Application of BLR technique

DISCUSSION

The aim of current research was to find out the efficacy of BLR procedure on neurophysiologic response in lumbar radiculopathy with radiating pain up to knee joint. Current study confirms that BLR technique effectively decreases back and thigh pain as well as increases the range of SLR. Findings of present study are also corroborated by previous studies [5,9]. According to Shujat H et al., in sedentary life style population, hamstring tightness is more prevalent especially in female, is one of the common cause of lower back pain [10]. During this intervention, the gluteus maximus and the adductor portion of the hamstring are stretched, which aids in releasing adhesions between the muscles thereby it improves hip flexion range of motion i.e SLR [7]. BLR technique activates the neurophysiologic responses that control the muscle stretch resistance [7]. After BLR, the hamstring muscles become more flexible right away because the neurophysiologic reaction may make it easier for the shortened muscles to withstand the stretch [11,12]. There was also decrease in disability due to lower back discomfort due to contract relax method where peripheral somatic input is provided to the contracting muscle when contract relax cycles was applied to hamstrings at a segmental level. Patient's perception of her "straight leg raise" limit may be influenced by modifications in "alpha and gamma motor neuron activity", which affect the hamstring muscles, after implementing this technique, which are similar to the effects seen after implementing "proprioceptive neuromuscular facilitation (PNF) technique" [13,14]. BLR aids in opening the lumbar spine's intervertebral foramen (possible mechanism is posterior tilting of pelvis) and facet joints and this helps in stretching and releasing thoraco-lumbar fascia thus improving the hamstring flexibility [6]. In long-term, conservative management is comparable to management by surgical means for lumbar radiculopathy ailment.

CONCLUSION

Subject responded very well to BLR technique. Present case report concludes, a meaningful change in neurophysiologic response was seen, as the back and posterior thigh pain decreases as well

as range of SLR was increased. BLR technique may be a viable conservative intervention for lumbar radiculopathy having symptoms up to knee joint.

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