

Effects of Mulligan Traction Leg Raise vs. Slump Stretching on Pain and Passive Leg Raise in Lumbar Radiculopathy

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Abstract

Objective: To compare the effects of Mulligan traction leg raise vs. slump stretching on pain and passive leg raise in lumbar radiculopathy. **Study design:** Quasi experimental study. **Place & Duration:** Family Clinic. (September 2020 to February 2021). **Methodology:** Consecutive sampling technique was used to select a sample of 40 patients from physiotherapy department of family clinic, Lahore. Study was completed in 6 months. Patients randomly allocated into 2 groups. Group A performed Mulligan traction leg raise with lumbar stabilization exercises and Group B performed slump stretching with lumbar stabilization exercises. Patient evaluated for improvement in symptoms through numeric pain rating scale and goniometry. Each group received treatment session 3 times per week for 4 weeks. Data was analyzed by using SPSS version 21. **Results:** The result cleared that Group A Mulligan traction leg raise showed significant results in pain and passive SLR ROM with p value less than 0.05. Group A showed decreased in pain with mean value of 1.60 ± 1.536 as compared to Group B where pain is 4.00 ± 1.947 . Where Group A showed improvement in passive SLR with mean value of 86.15 ± 7.206 as compared to Group B where passive SLR ROM with mean values is 59.35 ± 12.683 . Group B showed improvement but not showed significant results in comparison of group A. **Conclusion:** It is concluded that Group A Mulligan traction leg raise with lumbar stabilization exercises is much better technique to improve pain and passive SLR ROM in lumbar radiculopathy patients. Group B slump stretching with lumbar stabilization exercises is also very effective but results showed significant effects of Mulligan traction leg raise.

Keywords: Continuous passive motion therapy; Muscle stretching exercises; Pain; Radiculopathy; Traction

Introduction

Lumbar radiculopathy is the most common encountered diagnosis in orthopedic clinical practices. [1] Middle aged and young patients are mostly affected from this condition. [2] Radiculopathy symptoms that patient describes are sharp and burning pain that radiates in the back side of lower extremity, can be due to disk herniation so associated symptoms like weakness and numbness also be experienced from this problem. [3,4] Eighty percent of people experience radicular pain at least 1 time in their lives according to the American Association of Orthopedic Surgeons. [5,6] In majority cases disk herniate into posterolateral direction and compresses the ipsilateral nerve roots mainly L4, L5 and L5, S1 can produce non radicular or radicular symptoms. [7] Sacroiliac joint dysfunction, spasmodic and tightened piriformis lead to piriformis syndrome is also a vital contributor in radiculopathy. [8] Estimated prevalence in population is 3%-5% affecting both genders. [9] Having lifetime Incidence of 60%-80%. [10] Symptoms development in females occurs the age of 50s and 60s whereas in males symptoms produce at the age of 40s. [11] Interventions related to manual therapy have always shown significant improvements in functional outcomes and in pain of low back patients receiving treatment for both non-neural and neural type painful conditions. [12] The treatment technique used as an intervention widely for the dysfunction of low back pain is Mulligan's Mobilization With Movement (MWM). It's a painless intervention that has immediate benefits in pain relief

in patients with radiculopathy which has reduced range of hip flexion. [13-15] Within the vertebral canal the mechano-sensitivity of the neural structures evaluated by neuro-dynamic or slump test. [16-19] It's also an interventional tool. [20] Slump test is more sensitive than SLR test but SLR found more specific than slump test. [21] In current research work, we find out the effects of Mulligan traction leg raise versus slump stretching on pain and passive SLR ROM in lumbar radiculopathy patients, to check beneficial technique in lumbar radiculopathy patients. Through the result of this study, researcher believe to contribute some knowledge regarding techniques either Mulligan traction leg raise versus slump stretching improve pain and passive SLR ROM or not and which technique showed significant results.

Case Study

It was a quasi-experimental study. This study was conducted at family clinic Baghbanpura, Lahore, Pakistan. Study was conducted from September 2020 to February 2021. A sample size of 40 was calculated by using Open Epi, version 3. To

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conduct this study, consecutive sampling technique used to collect data and on the basis of inclusion exclusion criteria 40 patients with lumbar radiculopathy were selected from the family clinic’s OPD. Informed consent was taken from the patients before starting treatment. Assessor was blinded which made this study a single blinded study. The investigator used lottery method to randomly allocate the participants into Group A (Mulligan traction leg raise) and group B (slump stretching). All subjects with pre diagnosed lumbar radiculopathy, unilateral or bilateral radiation of pain in sciatic nerve distribution, with SLR test positive, both genders male and female, 18 to 50 years’ age was the inclusion criteria for this study. Patients undergoing history of spinal surgery in previous 6 months, Knee and ankle pathology causing limitation of movement, clinical conditions such as over sensitive skin, patient with cardiac pacemaker, pregnancy etc, Serious spinal condition e.g infection, tumors, osteoporosis, spinal fracture, Inability to hold slump stretching position, reproduction of symptoms on neck flexion part of slump test, Patients with cervicogenic headache, VBI, spinal deformities and ankylosing spondylitis was the exclusion criteria for this study. Group A Mulligan traction leg raise was allocated 20 participants and in the other group B slump stretching also 20 participants were allocated. The data collection tools used was numeric pain rating scale for pain and goniometer for passive SLR ROM.

In group A the subjects received Mulligan traction leg raise and lumbar stabilization exercises. Treatment session was given 3 times per week for 4 weeks for 20 minutes. Lumbar stabilization exercises includes static glutei, static back and static hamstring hold for 10 seconds with maximum 10 repetitions. While in Group B the subjects received slump stretching and lumbar stabilization exercises. Treatment session includes 3 times per week for 4 weeks for 20 minutes.

Lumbar stabilization exercises includes static glutei, static back and static hamstring hold for 10 seconds with maximum 10 repetitions. Evaluation was done before treatment and at the end of 4th week. The data was analyzed by SPSS version 21. The quantitative variables were presented as mean and standard

deviation. For checking the normality in the data Shapiro-Wilk test used. Before/after comparisons was done by using parametric methods as data is normally distributed. For within group comparison paired sample t-test and for between groups comparison independent t test was applied. An alpha-level of 0.05 was selected for level of significance.

Results

40 individuals were chosen for the study. The patients who fall in the inclusion criteria were 40. 40 subjects then randomly scattered into two treatment groups (Group A: Mulligan traction leg raise; Group B: Slump stretching). Both groups socio-demographic information was similar at baseline. Participants in Group A Mulligan traction leg raise were presented with mean age of 34.15 years ± 9.366 years and in Group B Slump stretching with 33.95 years ± 9.976 years. Participants in Group A were presented with mean height of 1.6490 meters ± 0.05794 meters and in Group B with 1.6685 meters ± 0.6327 meters. Participants in the Group A were presented with mean weight of 68.00 Kg ± 7.377 kg and in Group B with 70.80 kg ± 9.823 kg. Participants in Group A were presented with mean BMI of 24.955 kg/m² ± 3.7214 kg/m² and in Group B with 25.200 kg/m² ± 3.3479 kg/m² as shown in Table 1.

The pre and post treatment numeric pain rating scale values between two groups was done using independent sample t test. Analysis revealed that there was statistically significant difference in both groups with p value <0.05. Group A showed greater improvement in numeric pain rating scale value as shown in Table 2. The pre and post-treatment SLR ROM between two groups was done using independent sample t test. Analysis revealed that there was statistically significant difference in both groups as p value is less than 0.05 Group A showed significant difference in range as shown in Table 2.

Paired sample t-test was used to compare the values of numeric pain rating scale score and SLR range of motion within each treatment group. Results declared significant difference in both the groups but greater improvement was seen in Group A Mulligan traction leg raise as shown.

Table 1: 40 subjects randomly scattered into two treatment groups.

Group	Mean	Std. Deviation	
Mulligan traction leg raise (N=20)	Age (years)	34.15	9.366
	Height (meters)	1.649	0.05794
	Weight (Kg's)	68	7.377
	BMI (kg/m ²)	24.955	3.7214
Slump stretching (N=20)	Age(years)	33.95	9.976
	Height(meters)	1.6685	0.06327
	Weight(Kg's)	70.8	9.823
	BMI(kg/m ²)	25.2	3.3479

Table 2: Test performed values.

Variable		Treatment group		p value
		Mulligan traction leg raise	Slumps stretching	
Numeric pain rating scale (NPRS)	Pre-treatment (Mean ± SD)	6.40 ± 1.81	6.95 ± 1.73	0
	Post-treatment (Mean ± SD)	1.60 ± 1.53	4.00 ± 1.94	0
Goniometer (Passive SLR Range)	Pre-treatment (Mean ± SD)	53.10 ± 13.76	54.50 ± 12.36	0
	Post-treatment (Mean ± SD)	86.15 ± 7.20	59.35 ± 12.68	0

Discussion

The aim of this study was to compare two non-invasive treatment techniques, one was Mulligan traction leg raise and other was slump stretching on pain reduction and improvement in range in lumbar radiculopathy patients.

In current study, there is statistically significant difference in results of numeric pain rating scale in between group analysis. Pain decreased to greater extent in post treatment of Mulligan traction leg raise group with mean value 1.60 ± 1.536 as compared to slump stretching group 4.00 ± 1.947 of group. The results are in accordance with one study conducted in 2018 in which Swati et al. found that numeric pain rating scale value decreased markedly by rehabilitating a patient with lumbar radiculopathy in Mulligan traction leg raise group.^[8] Another study conducted in 2016 by Giovanni et al. showed results that numeric pain rating scale showed improved pain in post treatment evaluation which supports the results of this study.^[22]

Gustavo Plaza-Manzano conducted study in 2020 in lumbar radiculopathy patients and concluded that reduction in mechanical sensitivity is seen but not seen a greater change in pain or pressure pain threshold by using NPRS.^[23] The decrease in pain in Group A is more due to the fact that mulligan traction leg raise is more directed to specific functional movements of lumbar spine and so targets the joint restrictions. The improved blood circulation can further decrease the pain level. Group B also showed improvement but to limited extent as it includes general exercises that targets the general mobility and muscular strength.

The results of present study showed that there was statistically significant difference between post-treatment SLR ROM of both groups. Group A showed greater improvement in range with mean value of 86.15 ± 7.206 as compared to Group B with mean value of 59.35 ± 12.683 . These values of result are consistent with another previous research which shows the similar results in terms pain and range of motion conducted by Swati et al.^[8]

These results are supported by a previous research which showed improved ranges. Improvement in SLR range of motion measured by goniometer in Basant kumar studies showed significant results in one group and non-significant in other group supporting the results conducted by this study.^[24] Patel conducted RCT and compare the results of 2 group so it showed that Mulligan leg raise have greater improvement rather than slump stretching but not significant in pain and ROM compared to another group.^[25]

Traction leg raise elongate muscle and hold this position provide greatest tolerated length so improve pain of restricted leg and elongation improve range. It mobilize the nerve as well as stretch the muscle so symptom's relief because traction not provoke symptoms. Also in two studies conducted by Berlin and Larsson and pal showed significant improvement in pain and SLR range angle and strongly encouraged the Mulligan traction leg raise.^[8] In passive ROM elongation of muscle are beyond the slack length so range increases by repetitive activity performing for several days.^[24]

Conclusion

It is concluded that Group A Mulligan traction leg raise with lumbar stabilization exercises is much better technique to improve pain and passive SLR ROM in lumbar radiculopathy patients. Group B slump stretching with lumbar stabilization exercises is also very effective but results showed significant effects of Mulligan traction leg raise.

Conflict of Interest

This study has no conflict of interest to be declared by any author.

References

1. Nisar Ahmed, Zka CC. Comparison of Mulligans Spinal Mobilization with Limb Movement (SMWLM) and neural tissue mobilization for the treatment of lumbar disc herniation: A randomized clinical trial. *J Nov Physiother.* 2016;6.
2. Anderson PAMM, Paul C, Angevine, Peter D. Randomized controlled trials of the treatment of lumbar disk herniation: 1983-2007. *J Am Acad Orthop Surg.* 2008;16:566-573.
3. Windt SE, Riphagen II. Physical examination for lumbar radiculopathy due to disc herniation in patients with low-back pain (Review). *Cochrane Database Syst Rev.* 2012;2.
4. Konstantinou KHS, Jordan JL. The impact of low back-related leg pain on outcomes as compared with low back pain alone: A systematic review of the literature. *Clin J Pain.* 2013;29:644-54.
5. Singh VMM, Malik J, Ganer N, Comparison between posterior to anterior mobilization and traction SLR on pain and neurodynamic mobility in patients of low back pain. *Int J Physiother.* 2014;2:383-87.
6. Amit VN, Rita AG, Learman K. Effect of slump stretching versus lumbar mobilization with exercise in subjects with non-radicular low back pain: A randomized clinical trial. *J Man Manip Ther.* 2012;20:35-42.
7. Koes BW, van Tulder MW. Professor of health technology assessment 2, WC Peul, neurosurgeon. diagnosis and treatment of sciatica. *BMJ.* 2007;334:1313.
8. Swati M, Snehal G. Comparison between Mulligan traction leg raise vs. slumps stretching on pain, passive leg raise, and functional disability in lumbar radiculopathy. *J Clin Med Res.* 2018;6:140-6.
9. Tarulli ARE. Lumbosacral radiculopathy. *Neurol Clinical.* 2007;25:387-405.
10. Schoenfeld AJML, Matthew DOB, Julia OB, Christopher M. Characterization of the incidence and risk factors for the development of lumbar radiculopathy. *J Spinal Disord Tech.* 2012;25:163-7.
11. Andrew W, Tarulli. Lumbosacral radiculopathy. *Neurol Clin.* 2007;25:387-405.
12. Axel S, Toby H, Gerd M, Kathryn B. Outcomes differ between subgroups of patients with low back and leg pain following neural manual therapy: A prospective cohort study. *Eur Spine J.* 2011;20:482-90.
13. Toby HM, Antonio C. Effects of the Mulligan traction straight leg raise technique on range of movement. *J Man Manip Ther.* 2001;9:128-33.
14. Toby HCB, Ulla H, Hun TL, Merete O, David S. Mulligan traction straight leg raise: A pilot study to investigate effects on range

- of motion in patients with low back pain. *J Man Manip Ther.* 2013;14:95-100.
15. Shilpa K. Effects of various Mulligan techniques on hamstring muscle imbalance and lumbar spine mobility in marathon runners: A randomized control trial. *J Phys Educ Sport.* 2018;5:3-6.
 16. Steven Z, George P. Characteristics of patients with lower extremity symptoms treated with slump stretching. *J Orthop Sports Phys Ther.* 2002;32:391-8.
 17. Joshua AC, John DC, Jessica AP. Slump stretching in the management of non-radicular low back pain: A pilot clinical trial. *Man Ther.* 2006;11:279-86.
 18. Mohammadreza PP, Hamid H, Abbasali K, Hamid Z, Rasool B, Ali Get al. Effectiveness of slump stretching on low back pain: A systematic review and meta-analysis. *Pain Med.* 2019;20:378-96.
 19. Shaju D. Efficacy of slump stretching in combination with conventional therapy in non-radicular low back pain. *IJRAR.* 2019;6.
 20. Majlesi JTH, Ünalán H, Toprak S. The sensitivity and specificity of the slump and the straight leg raising tests in patients with lumbar disc herniation. *J Clin Rheumatol.* 2008;14:87-91.
 21. Giovanni EF, Francisco XA, Matheus W, Carolina GR, Rodrigo DM. Neurodynamic treatment did not improve pain and disability at two weeks in 4 patients with chronic nerve-related leg pain: A randomised trial. *J Physiother.* 2016;62:197-202.
 22. Gustavo PM. Effects of adding a neurodynamic mobilization to motor control training in patients with lumbar radiculopathy due to disc herniation. *Am J Phys Med Rehabil.* 2020;99:124-32.
 23. Basant KSM, Monalisa P, Patitapaban M. A comparative study of Mulligan traction straight leg raising and dynamic soft tissue mobilization to increase hamstringss flexibility. *IOSR-JNHS.* 2016;5:80-8.
 24. GP. To compare the effectiveness of Mulligan bent leg raising and slump stretching in patient with low back pain. *Indian J Physiother Occup Ther.* 2014;8:24-8.
 25. Pal BPM, Hossain MA. A controlled trail of lumbar traction in the treatment of back pain and sciatica. *Br J Rheumatol.* 1986;25:181-3.