Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i4.5927

EFFECT OF MULLIGAN SPINAL MOBILIZATION WITH LEG MOVEMENT (SMWLM) ALONG WITH KINESIOLOGY TAPING IN SUBJECTS WITH SCIATICA

Fiza Naeem[1], Sundus Farooq[2], Nosheen Manzoor[3*], Sabahat Rizwan[4], Sidra Faisal[5]

[1]Consultant Physiotherapist, Department of Physical Therapy, National Hospital Faisalabad, Pakistan
[2]Assistant Professor, Department of Physical Therapy and Rehabilitation Sciences, The University of Faisalabad, Pakistan
[3*]Assistant Professor, Department of Physical Therapy and Rehabilitation Sciences, School of Health Sciences, University of Management and Technology, Lahore, Pakistan
[4]Consultant Physiotherapist, Institute of Physical Therapy and Rehabilitation Sciences, Liaquat University of Medical & Health Sciences, Jamshoro, Pakistan
[5]Senior Lecturer, Department of Physical Therapy, Riphah International University, Lahore, Pakistan

***Corresponding Author:** Nosheen Manzoor
Assistant Professor, Department of Physical Therapy and Rehabilitation Sciences, School of Health Sciences, University of Management and Technology, Lahore, Pakistan
Email address: nosheenmanzoor@umt.edu.pk

ABSTRACT

Background: Mulligan spinal mobilization with leg movement (SMWLM) along with kinesiology taping performed at the patients to treat sciatica. **The objective of this** study to check the effects of Mulligan Spinal mobilization with leg movement (SMWLM) with and without kinesiology taping on radicular pain, Lumbar range of motion (Flexion/Extension), functional disability, and gait parameters in patients with sciatica.

Material and methodology: This Randomized clinical trial is conducted in the Department of Physiotherapy, National Hospital Faisalabad, Pakistan. Using a list of inclusion and exclusion requirements, 44 participants were selected through Non-probability purposive sampling technique. These participants were arbitrarily allotted into 2 groups. **Group A:** Hot-pack + Mulligan mobilization + Kinesiology taping technique **Group B:** Hot-pack + Mulligan mobilization. An electric heat pack was applied to the back area to both groups as the starting treatment for 20 minutes.

Results: The HOT-PACK and Mulligan mobilization technique (Group B) showed statistically significant effects on a number of measures pertaining to upper limb position, stance phase, swing phase, RVGA, pain, disability, and range of motion.

The HOT-PACK and Mulligan mobilization technique (Group B) showed statistically significant effects on a number of measures pertaining to upper limb position, stance phase, swing phase, RVGA, pain, disability, and range of motion.

Conclusion: In conclusion, the findings show that the Mulligan mobilization technique and HOTPACK (Group B) had favorable impacts on a number of factors relating to movement quality, discomfort, disability, and range of motion. However, it is important to note that other variables did

not exhibit meaningful gains, indicating potential restrictions or unpredictability in the technique's efficacy for those particular elements.

Keywords: includes Sciatica, Mulligan spinal mobilization with leg movement, Kinesiology taping.

INTRODUCTION:

The sciatic nerve is the thickest nerve in the body at around 2 cm broad, which tracks along the back of the leg, supplies the majority of the lower region.(1) Sciatica is characterized as radiating pain alongside the path of its nerve, which is frequently felt in the foot and toes on the side that is affected.(2) The term "sciatica" is the one that is most frequently used in the literature, the terms "lumbar disc syndrome", "lumbar disc protrusion causing radiculopathy" and "lumbo-sacral radicular syndrome" are furthermore used. The disorder may range from brief, isolated episodes to a chronic, remitting disease that lasts months or years.(3)Sciatica typically follows a dermatomal pattern; the pain and the other symptoms are felt in the area of the body that is innervated by the affected nerve root. In the case of sciatica, this is usually the L4-L5 or S1 nerve root, which innervates the lower back, buttocks, leg, and feet.(4) The reflexes of the affected area may also be affected in sciatica.(5)

For an instance, a revision of the general Finnish citizens estimated that 4.8% of people had sciatica at some point in their lives. According to another epidemiological research grounded on medical professionals' the lifetime cumulative incidence is 12.2%.(6) Individuals between the ages of 30 and 55 have a significantly high incidence rate of sciatica. Males (5.3%) have a higher prevalence than females (3.7%).(7)

(Smoking, obesity, and occupational risks such professions demanding a lot of heavy lifting, bending, and extended standing are all modifiable factors. The non-modifiable characteristics were socioeconomic class, gender, and age.(8, 9) The cause of sciatica was initially thought to be lumbar vertebral disc prolapse, radiculopathy. It occurs when the body is subjected to repetitive or prolonged activities that place excessive stress on lower back and legs, such as running, bending, or lifting heavy objects. (10)

Symptoms of sciatica are unilateral leg pain more severe than low back pain, pain most commonly radiating posteriorly at the leg and below the knee, numbness and/or paraesthesia in the involved lower leg, Positive neural tension test with provocation of pain in the affected leg (straight leg raise test/femoral nerve test/slump test). Neurological deficit associated with the involved nerve root.(11)

The Lasègue's sign, often known as the "straight leg test," is the most common diagnostic technique for sciatica. It is positive if pain in the sciatic nerve's distribution is brought at an angle between 30 and 70 degrees by passively flexing the straight leg.(12) SLR test was found to be more specific than slump test, slump test is more sensitive. The sciatic nerve tension test is known as the slump test. The diagnosis of lumbar disc herniation can be aided by neuroimaging techniques like computerized tomography (CT) and magnetic resonance imaging (MRI).

The first course of treatment for people with sciatica is conservative, which includes education regarding the condition, the function of imaging, and suggestions to maintain an active lifestyle. Conservative treatment approaches for lumbar radiculopathy or sciatica include bed rest, physiotherapy, nonsteroidal anti-inflammatory drugs, muscle relaxants, and even opioids. In some cases, epidural steroid injections may be used to reduce inflammation and relieve pain.(6) Lumbar radiculopathy can be treated either conventionally or surgically.(13) physiotherapy approaches have been utilized to treat low back ache brought on by including traction, lumbar radiculopathy, stretching, strengthening workouts, and machines including Interferential current therapy (ICT).(7, 14)

Objective: To check the effects of Mulligan Spinal mobilization with leg movement (SMWLM) with and without kinesiology taping on radicular pain, Lumbar range of motion (Flexion/Extension), functional disability, and gait parameters in patients with sciatica.

Research Question: What are the effects of Mulligan Spinal mobilization with leg movement (SMWLM) along with and without kinesiology taping on pain, Range of motion, disability and gait parameters in subjects with sciatica?
Null hypothesis: There is no difference in Mulligan Spinal mobilization with leg movement (SMWLM) along with and without kinesiology taping on pain, Range of motion, disability and gait parameters in subjects with sciatica.

Alternative hypothesis
There is difference in Mulligan Spinal mobilization with leg movement (SMWLM) along with and without kinesiology taping on pain, Range of motion, disability and gait parameters in subjects with sciatica.

MATERIAL AND METHODOLOGY

Design Setting & Duration: This Randomized clinical trial was carried out in the department of physical therapy, National Hospital, Faisalabad from February to July 2023. This research was started after approval from ethical committee of National hospital and research committee of the University of Faisalabad Tuf/IRB/300/24. Also informed consent was received from all the patient before inclusion.
Sampling and Randomization: All adult patients both male and female with 20 to 65 age, with radiating leg pain, positive slump test and reproduction of symptoms with SLR were included. Patients with recent trauma to lower limb, foot drop, Spondylolisthesis, SI joint dysfunction, scoliosis were excluded. Sample size was estimated as 44 by using the formula for continuous data.
$\mu 1$ = population mean in treatment Group 1 (2.9) $\mu 2$ = population mean in treatment Group 2 (1.77)
$\mu 1 - \mu 2$ = the difference the investigator wishes to detect (1.13) $\sigma 2$ = population variance (SD) (4.24)
a = conventional multiplier for alpha = 0.05
b = conventional multiplier for power = 0.80 (31)
44 patients were allocated randomly into Group A: Hot pack + Mulligan mobilization + Kinesiology taping technique and Group B: Hot pack + Mulligan mobilization; 22 patients to each group.
Procedure, intervention and follow up: All patients were trained on Visual Analogue Scale. Hot packs were applied to the back area to both groups as a starting treatment for 20 minutes.(15)Mulligan spinal manipulation with leg movement (SMWLM) was performed on their back. On the desired spinous process, sustained transverse glide was carried out with 10 repetitions in each of three sets in the first session and 10 repetitions in each of three sets in the following sessions. 25). In a sitting position, KT was administered. Over the exaggerated lumbar, four I strips were placed at a 25% tension and overlapped in the shape of a star. Kinesiology taping was applied be three times a week for four consecutive weeks.(16) After allocation the respective treatment and follow-up plan was specified to the participants.
Data collection instrument and plan: Pain, Lumbar ROM and disability in participants was measured by Visual Analogue Scale (VAS), Goniometry, and Modified Oswestry Disability Index 31 (MODI) before and after the 4 weeks of treatment period. Gait parameters were evaluated by Rivermead Visual Gait Assessment (RVGA).
Data analysis: Data scrutiny was done by using SPSS 25. Level of significance was set at P = 0.05

RESULTS:

Sample description: Table 1.1 represents the age of patients of both groups. There are a total of 22 people in Group A included 5 (22.7%) patients in age group 20-30 years and 6 (27.3%) patients in age group 31-40 years and 7 (31.8%) patients are between 41 and 50 and 4 (18.2%) patients were of 51-61 years. There are also 22 people in Group B as a whole. 4 (18.2%) patients in age group 20-30

years and 7 (31.8%) patients in age group 31-40 years and 5 (22.7%) patients are between 41 and 50 and 6 (27.3%) patients were of 51-61 years.

Table 1.2 represents the gender distributions of both groups. In Group A frequency of male participant is 6 as 27.3 %and frequency of female participants is 16 as 72.3%. In Group B frequency of male participant is 6 as 27.3% and frequency of female participants is 16 as 72.7%. In both therapy groups, there is an equal gender distribution overall, with 72.7% of participants being women and 27.3% being men.

Descriptive statistics & estimation of parameters:

Table 1.3: This table shows within the Group A.

(Hot-pack + Mulligan mobilization + Kinesiology taping technique) technique group analysis demonstrated that P values represent there is a significant difference within the group effects.

Overall, this study's findings show that the HOT-PACK, Mulligan mobilization, and kinesiology taping technique (Group A) had favourable impacts on a number of factors relating to movement quality, discomfort, disability, and range of motion. These findings confirm that the intervention was successful in enhancing functional outcomes and musculoskeletal problems in the group under study.

Table 1.4: This table shows within the Group B.

(Hot-pack + Mulligan mobilization) technique group analysis demonstrated that P values represent there is a significant difference within the group effects.

In conclusion, the findings show that the Mulligan mobilization technique and HOTPACK (Group B) had favorable impacts on a number of factors relating to movement quality, discomfort, disability, and range of motion. However, it is important to note that other variables did not exhibit meaningful gains, indicating potential restrictions or unpredictability in the technique's efficacy for those particular elements.

Table 1.1

AGE OF PARTICIPANTS				
Treatment Group	**Type of Group**	**Frequency**	**Percent**	**Cumulative Percent**
Group A	20-30	5	22.7	22.7
	31-40	6	27.3	50.0
	41-50	7	31.8	81.8
	51-60	4	18.2	100.0
Group B	20-30	4	18.2	18.2
	31-40	7	31.8	50.0
	41-50	5	22.7	72.7
	51-60	6	27.3	100.0

Table 1.2

GENDER OF PARTICIPANTS				
Treatment Group		**Frequency**	**Percent**	**Cumulative Percent**
Group A	**Female**	16	72.7	72.7
	Male	6	27.3	100.0
Group	**Female**	16	72.7	72.7
	Male	6	27.3	100.0

Table 1.3

HOT-PACK + MULLIGAN MOBILIZATION + KINESIOLOGY TAPING TECHNIQUE (GROUP A)					
Variables	**Mean±SD**	**IQR**	**Mean Rank**	**Z value**	**P-value**
1. (RVGA)					
● **Upper Limb Position**					
Shoulder Deviation	0.77 ± 0.68	1.00	4.50	-2.714	0.007
Elbow Flexion	1.40± 0.59	1.00	9.00	-3.945	0.000
● **Stance Phase**					
Trunk Flexion	0.95± 0.72	1.00	6.00	--3.207	0.001
Trunk Side Flexed	0.59± 0.50	1.00	4.00	-2.646	0.008
Trunk And Pelvis: Lateral Displacement	0.09 ± 0.29	0.00	1.50	-1.414	0.157
Contralateral Drop Pelvis	0.31 ± 0.56	0.00	2.00	-1.732	0.083
Hip Extension	1.36± 0.72	1.00	9.00	-4.025	0.000
Hip Retraction	1.13± 0.71	1.00	7.50	-3.416	0.001
Knee Flexion	1.31 ± 0.56	1.00	9.50	-4.001	0.000
Knee Extension	0.68± 0.56	1.00	4.00	-2.530	.0/011
Ankle Dorsi Flexion	0.45± 0.67	0.00	3.50	-.816	0.414
Inversion	0.95± 0.72	1.00	7.50	-3.494	0.000
Plantar flexion decreased at toe-off	0.95± 0.72	1.00	6.00	-3.207	0.001
● **Swing Phase**					
Trunk Flexed	0.45± 0.67	1.00	10.50	-4.379	0.000
Trunk Side Flexed	0.36± 0.58	1.00	4.00	-2.460	0.014
Hike Pelvis	0.50± 0.67	0.50	5.50	-.535	.593
Backward Rotation Pelvis	0.36± 0.49	0.50	3.13	-1.414	0.157
Hip Flexion	0.54± 0.67	1.00	4.08	-1.897	0.058
Knee Flexion	0.31± 0.64	1.00	8.00	-3.771	0.000
Ankle In Excess Plantar Flexion	0.50± 0.67	1.00	4.50	-2.828	0.005
Total RVGA	12.9±7.99	12.00	11.84	-3.814	0.000
Visual Analogue Scale	1.77 ± 0.68	2.00	11.50	-4.143	0.000
Modified Owestry Disability Index Score	1.22 ± 0.42	1.00	11.00	-4.118	0.000
Lumber Flexion (ROM)	41.1 ±6.22	39.00	11.50	-4.119	0.000
Lumber Extension (ROM)	12.5±1.76	12.00	0.00	-4.025	0.000
Right Side-bending(ROM)	16.1±2.96	16.50	0.00	-3.734	0.000
Left Side-bending (ROM)	17.7 ± 1.71	18.00	13.00	-3.315	0.000

Table 1.4:

HOT-PACK + MULLIGAN MOBILIZATION (GROUP B)					
Variables	**Mean ±SD**	**IQR**	**Mean Rank**	**Z- value**	**P-value**
1. (RVGA)					
● **Upper Limb Position**					
Shoulder Deviation	1.18± **0**.73	1.00	6.00	-3.127	0.002
Elbow Flexion	1.31± **0**.47	1.00	10.50	-4.234	0.000
● **Stance Phase**					
Trunk Flexion	**1.04** ± **0**.57	1.00	3.00	-2.236	0.025
Trunk Side Flexed	**0**.59± **0**.50	1.00	3.00	-2.236	0.025
Trunk And Pelvis: Lateral Displacement	**0.00** ± **0.00**	0.00	0.00	0.000	1.000
Contralateral Drop Pelvis	**0**.36± **0**.58	0.00	3.00	-2.121	0.034
Hip Extension	1.63± **0**.72	1.50	6.50	-3.153	0.002
Hip Retraction	**0**.90± **0**.75	1.00	4.00	-2.460	0.014
Knee Flexion	**1.31** ± **0.83**	1.00	5.50	-3.051	0.002
Knee Extension	**0**.90± **0**.52	1.00	4.50	-2.828	0.005
Ankle Dorsi Flexion	**0**.72± **0.88**	0.50	2.00	-1.633	.102
Inversion	**0**.63± **0**.65	1.00	1.50	-1.414	.157
Plantar Flexion Decreased At Toe-Off	**0**.95± **0.72**	1.00	6.00	-3.317	0.001
● **Swing Phase**					
Trunk Flexed	**0**.90± **0**.52	1.00	4.00	-2.646	0.008
Trunk Side Flexed	0.54± **0**.67	0.00	2.50	0.000	1.00
Hike Pelvis	**0**.40± **0**.59	0.00	2.00	-.577	.564
Backward Rotation Pelvis	**0**.36± **0**.49	0.00	2.00	-.577	.564
Hip Flexion	**0**.40± **0**.59	0.00	2.00	-.447	.655
Knee Flexion	**0**.40± **0**.59	0.00	1.50	-1.414	.157
Ankle In Excess Plantar Flexion	**0**.40± **0**.59	0.00	1.00	-1.000	.317
Total RVGA Score	13.0±8.22	11.00	10.97	-3.238	.001
Visual Analogue Scale	6.95±1.25	7.00	7.00	-3.222	0.001
Modified Owestry Disability Index Score	2.50± **0**.67	2.50	9.00	--3.758	0.000
Lumber Flexion (ROM)	30.4±3.93	31.00	7.00	-3.457	0.001
Lumber Extension (ROM)	8.68±2.47	8.00	0.00	-3.744	0.000
Right Side-Bending(ROM)	14.3±1.67	14.50	0.00	-3.647	0.000
Left Side-Bending (ROM)	13.2±3.16	12.00	0.00	-3.200	0.001

DISSCUSSION

One of the most incapacitating conditions for people who suffer from pain or The current study's goal was to link leg mobility with the Mulligan Spinal Mobilization's effects on paresthesia in the

dispersal of sciatic nerve is low back pain coupled with sciatica specifically about radicular pain, lumbar range of motion (flexion/extension), functional impairment, and gait characteristics.

In a parallel group, single-blind randomised clinical trial, Usman Garba Abdue et al. investigated the long-term clinical consequences of using neurodynamic mobilisation (NM) in conjunction with spinal manipulative therapy (SMT) or mobilisation (MOB) for the treatment of lumbar disc herniation patients associated with radiculopathy. The data demonstrate that the MOB set expressively outperformed the SMT set in all consequences (p 0.05) and for entire timeframes. At long-standing continuation, these changes were also clinically significant for outcomes related to activity restriction, functional mobility, and quality of life. Additionally, at follow-up intervals of 6, 12, 26, and 36 months, these increases were clinically significant for neurodynamic tests, sensory impairments, the severity of back pain, quality of life ,functional mobility, and activity limitation measures. The chance of improvement at 12 weeks after randomization was 40% lower in the SMT set matched to the MOB group. According to this study, treatment with MOB with NM resulted in greater improvements in DHR patients than treatment with SMT plus NM. At long-standing continuation, these changes were also clinically substantial for outcomes related to activity restriction, functional mobility, and quality of life.(17) In contrast findings also suggested that gait is improved with spinal mobilization.

Dr. Amrutkuvar H. Pawar et al, Prolapsed intervertebral discs and lumbar spondylosis can both result in lower back pain with or also without the radiculopathy. According to Mulligan, the traction leg elevation and bented leg elevation procedures can help individuals with low back pain increase their hip flexion range of motion In order to evaluate Mulligan's Traction's efficiency Raising the leg straight or bent in the presence of low back radiculopathy, Dowling's approaches regarding the therapy of disc herniation associated with radiculopathy (LDHR) and pain and impairment, Bashir PhD organised a study. Twenty participants in each of the PINS and SMWLM groups were chosen at random from a total of 40 people with LDHR. At the baseline, four and eight weeks after the intervention, each participant was evaluated. The Roland-Morris Disability Survey and the VAS were used to measure the main outcomes, namely pain and disability. The Short-Form 36 for quality of life, the Sciatica Frequency Index, the Global Rating of Change Scale general perception of recovery and, the Sciatica Bother someness Index, were secondary variables. The participant's starting point individualities in the 2 sets did not vary suggestively. According to the findings, there were substantial temporal impact for every study outcome (P .001) within each group. On every outcome measure, on the other hand, there was not any statistically noteworthy alteration among the 2 sets (P >.05). In accordance with the current results, there was no alteration in pain levels or the levels of disability among the two manual modalities used to treat LDHR(18)

On the other side, recent study have also shown that spinal mobilisation, along with Kinesio taping, has beneficial effects but negative results to disability.(19)

CONCLUSION

It is concluded after doing a thorough investigation that there is a notable difference in between the 2 therapies in expression of how they affect Pain, Gait, Lumber Flexion, and Lateral Bending. The study, has led to the conclusion that the two treatments 67 under examination show distinct differences in how they affect these particular parameters.

REFFRENCE

1. Poutoglidou F, Piagkou M, Totlis T, Tzika M, Natsis K. Sciatic nerve variants and the piriformis muscle: a systematic review and meta-analysis. Cureus. 2020;12(11).
2. Stynes S, Grøvle L, Haugen AJ, Konstantinou K, Grotle M. New insight to the characteristics and clinical course of clusters of patients with imaging confirmed disc-related sciatica. European Journal of Pain. 2020;24(1):171-81.

3. Kim Y, Lee E, Lee JW, Kang Y, Ahn JM, Kang HS. Clinical and imaging characteristics of patients with extreme low back pain or sciatica referred for spinal injection. Neuroradiology. 2019;61:881-9.
4. Perreault T, Fernández-de-Las-Peñas C, Cummings M, Gendron BC. Needling interventions for sciatica: Choosing methods based on neuropathic pain mechanisms—A scoping review. Journal of clinical medicine. 2021;10(10):2189.
5. Singh RK. An unusual cause of sciatica in an immunocompromised patient. bmj. 2021;372.
6. Afzal M, Memon S. Treatment of Sciatica by Neural Flossing Technique (NFT) in Adults. Pakistan Journal of Rehabilitation. 2022;11(1):8-16.
7. Cashin A. Evidence-Based Management for Low Back Pain: Quality, Mechanisms and Reporting: UNSW Sydney; 2021.
8. Biz C, de Iudicibus G, Belluzzi E, Dalmau-Pastor M, Bragazzi NL, Funes M, et al. Prevalence of chronic pain syndrome in patients who have undergone hallux valgus percutaneous surgery: a comparison of sciatic-femoral and ankle regional ultrasound-guided nerve blocks. BMC Musculoskeletal Disorders. 2021;22(1):1-15.
9. Nisargandha MA, Parwe SD. Does Obesity Lead to Sciatic Pain: A Comparative Study. International Journal of Current Research and Review. 2020;12:120-25.
10. Naber WJ, Netzloff CL, Bakshi RR. Atypical Cause for Back Pain and Sciatica in a 35-year-old Female with Fibromyalgia. American Journal of Physical Medicine & Rehabilitation. 2023:10.1097.
11. Koes BW, Van Tulder M, Peul WC. Diagnosis and treatment of sciatica. Bmj. 2007;334(7607):1313-7.
12. Abdel-Wanis M. A NEW ALGORITHM TO HELP IN DIAGNOSIS ON THE CAUSE OF SCIATICA. Egyptian Journal of Orthopedic Research. 2021;2(2):53-4.
13. Furlong B, Etchegary H, Aubrey-Bassler K, Swab M, Pike A, Hall A. Patient education materials for non-specific low back pain and sciatica: A systematic review and meta-analysis. Plos one. 2022;17(10):e0274527.
14. De Silva U, Bapat V, Vedpathak S. A Literary Review on Viddha Karma and Its Role for Pain Management in Sciatic Neuritis. Journal of AYUSH: Ayurveda, Yoga, Unani, Siddha and Homeopathy. 2022;11(3):9-16p.
15. Rizzo RR, Ferraro MC, Wewege MA, Cashin AG, Leake HB, O'Hagan ET, et al. Targeting neurotrophic factors for low back pain and sciatica: a systematic review and meta-analysis. Rheumatology. 2022;61(6):2243-54.
16. Landsbergis P, Johanning E, Stillo M, Jain R, Davis M. Occupational risk factors for musculoskeletal disorders among railroad maintenance-of-way workers. American Journal of Industrial Medicine. 2020;63(5):402-16.
17. Park JW, Lee Y-K, Lee YJ, Shin S, Kang Y, Koo K-H. Deep gluteal syndrome as a cause of posterior hip pain and sciatica-like pain. The bone & joint journal. 2020;102(5):556-67.
18. van Dijk W, Meinders MJ, Tanke MA, Verkerk EW, Westert GP, Jeurissen PP. Medicalization of sciatica and its treatment. Social Theory & Health. 2022:1-18.
19. Srichandraphan N, Poopitaya S, Chitragran R. The Accuracy of Slump Test for Diagnosis Spinal Stenosis with Sciatica Pain. Ann Short Rep Clin Image. 2021;3(1):1021.