EFFECTIVENESS OF NEURAL MOBILIZATION TO IMPROVE PAIN AND DISABILITY IN RADIATING AND NON-RADIATING LOW BACK PAIN PATIENTS – A SYSTEMATIC REVIEW

Abstract

Background - Radiating pain in a leg region usually supplied by a single nerve root in the lumbar or sacral spine is the hallmark of sciatica; sensory and motor impairments may also be present. Neural mobilization is one therapy for lumbosacral radiculopathy on which physical therapists have placed a great deal of attention. Its goal is to mobilize peripheral neural tissue and surrounding tissues, which in turn affects the mechanical properties of peripheral nerves. NM can lessen the mechanical sensitivity of nerves and has a hypoalgesic impact.

Methods – Systematic review of the studies reporting separate outcomes of patients with LBP and LBP with leg pain and synthesis of available evidence. Literature search of English language peer-reviewed publication was conducted using CINAHL, Scopus, MEDLINE, PubMed and Cochrane Central Register of Controlled Trials and Google Scholar.

Results – Of the papers gained though search, 13 were included in the review and all these articles supported that Neural Mobilization is an effective method to decrease pain and improve functional ability in patients with NSLBP.

Key words - back pain, sciatica, pain, disability, neural mobilization

INTRODUCTION

A painful disorder known as lumbar radiculopathy is defined as the compression of the lumbar nerve roots.[1] Sciatica is a term that is commonly used to describe lumbar radiculopathy, and it is derived from its primary symptom.[2]

Radiating pain in a leg region usually supplied by a single nerve root in the lumbar or sacral spine is the hallmark of sciatica; sensory and motor impairments may also be present. The most typical reason for sciatica is a disk herniation. In Western nations, the estimated yearly incidence of sciatica is 5 cases per 1000 persons [3]. Radiculopathy occurs often in the lumbosacral spine. Depending on which nerve root is impacted, the patient's symptoms may present in a variety of ways. The most common levels affected by lumbosacral radiculopathy are L5-S1 and L4-5. The usual symptoms of this condition include radiating pain, which is frequently accompanied by numbness, paraesthesia, muscular weakness, or a combination of these symptoms. These symptoms frequently result in functional impairment [4]. Analgesic drugs, manipulation, surgical decompression, bed rest, and a range of physical therapy procedures are among the management options for sciatica. Therapeutic exercise, functional training, manual therapy methods such as mobilization and manipulation, mechanical, electrotherapeutic, and physical agents are examples of physical therapy approaches.[5] Neural mobilization is one therapy for lumbosacral radiculopathy on which physical therapists have placed a great deal of attention. Its goal is to mobilize peripheral neural tissue and surrounding tissues, which in turn affects the mechanical properties of peripheral nerves [6,7,8,9]. Additionally, research has shown that NM can lessen the mechanical sensitivity of nerves and has a hypoalgesic impact [10,11]. A manual therapy technique that might potentially be employed in the treatment of individuals with lumbar radiculopathy is neurodynamic mobilization. Neural mobilization consists of two components: sliders and manoeuvres. The objective of a nerve slider intervention is to prompt a gliding motion of the nerve trunk concerning its neighbouring tissues. This involves joint movements proximally to the targeted structure while allowing movement to release distally, followed by the opposite combination. Conversely, the intention of a nerve tensioner intervention is to generate tension in a nerve trunk concerning its neighbouring tissues. This involves joint movements both proximally and distally on the targeted structure simultaneously and in the same direction, resulting in an increase in nerve tension. [12] review

II. METHODS

2.1 Study Strategy –

The databases searched in this systematic review were Google Scholar, CINAHL, MEDLINE, PubMed and Cochrane Central Register of Controlled Trials. All the searches were performed in October 2023 to December 2023 and were assessed in January 2024.

The search strategy targeted clinical trials with three primary variables of interest, a specific participant population (people with low back pain) and intervention (neural mobilization). The search included the following terms: low back pain, backpain, sciatica, nerve root pain, leg pain, radicular pain, radiculopathy. To funnel the search, "trial" and "NOT meta-analysis" were added in order to target RCTs.

2.2 Inclusion Criteria –

Participants: Patients with age group 18-64 having non-specific low back pain. Intervention: Neural Mobilization. Comparison or control group: any. Outcome measures: LBP disability/function, pain, limitations. Other: Should be in English language only, full text publication.

2.3 Exclusion Criteria –

Studies with patients who had previously diagnosed or current specific spinal pathology, studies that did not incorporate a pain scale.

2.4 Study Selection –

The first author performed the initial literature search. First and second author independently selected the studies to be included in the review. Papers were included after assessing and examining the full text papers.

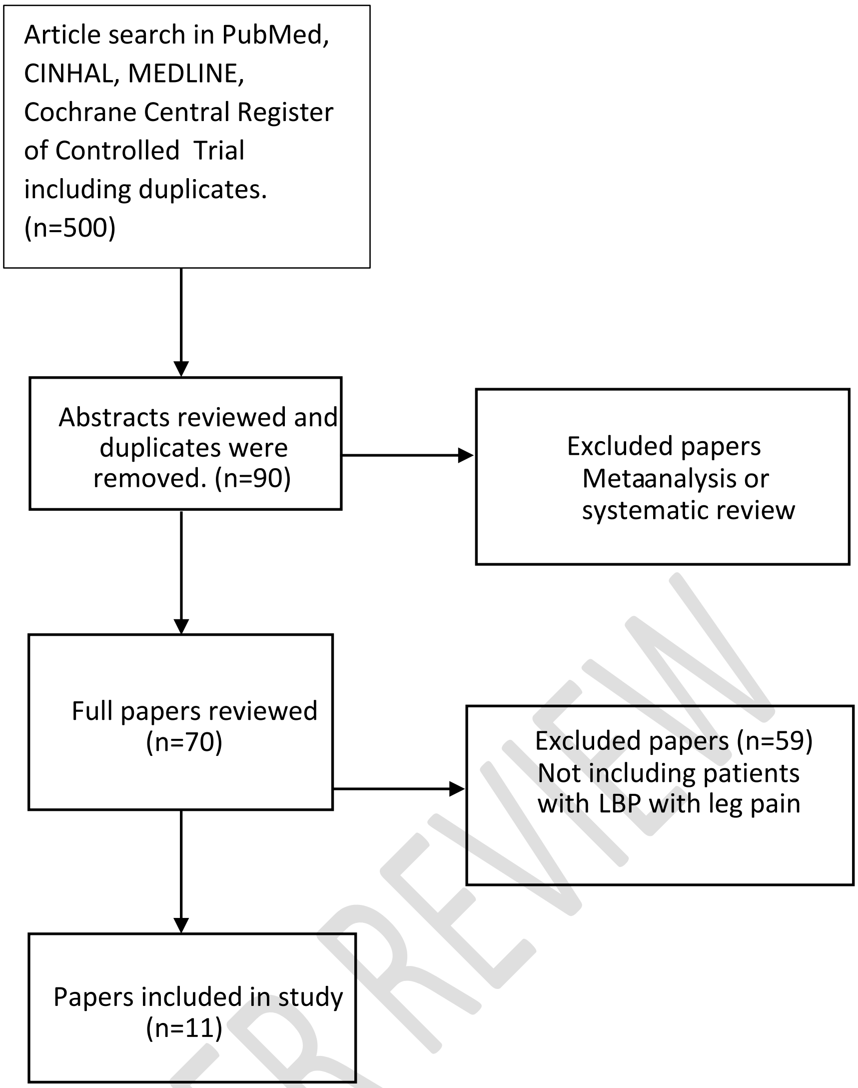

Figure 1 : PRISMA Search flow diagram

Methodological Quality Assessment –

All the studies were independently assessed by 2 authors using PEDro scale.

Table : 1 Methodological Quality Assessment

	Anikwe (2015)	**Bhatia (2017)**	**Choudhary (2022)**	**Chitra (2016)**	**Patel (2016)**
Eligibility Criteria	Yes	Yes	Yes	Yes	Yes
Random Allocation	Yes	Yes	Yes	Yes	Yes
Concealed Allocation	No	Yes	No	No	No
Baseline Compara bility	Yes	Yes	Yes	Yes	Yes
Blind Subjects	No	No	No	No	No

Blind Therapists	No	No	No	No	No
Blind Assessors	No	Yes	No	No	No
Adequate follow-up	Yes	Yes	Yes	Yes	Yes
Intention to treat analysis	No	Yes	No	Yes	No
Between group comparisons	Yes	Yes	Yes	Yes	Yes
Point estimates and variability	Yes	Yes	Yes	Yes	Yes
Total	5/10	8/10	5/10	6/10	5/10

	Jeong (2016)	**Morsi (2022)**	**Plaza Manzano (2020)**	**Tella (2022)**	**Vijaylaxmi (2022)**	**Ali M Alshami (2017)**
Eligibility Criteria	Yes	Yes	Yes	Yes	Yes	Yes
Random Allocation	Yes	Yes	Yes	Yes	Yes	Yes
Concealed Allocation	Yes	Yes	No	No	No	No
Baseline Comparability	Yes	Yes	Yes	Yes	Yes	Yes
Blind Subjects	No	No	No	No	No	No
Blind Therapists	No	No	No	No	No	No
Blind Assessors	Yes	Yes	No	Yes	No	No
Adequate follow-up	Yes	Yes	Yes	Yes	Yes	Yes
Intention to treat analysis	No	Yes	No	Yes	Yes	No
Between group comparisons	Yes	Yes	Yes	Yes	Yes	Yes

Point estimates and variability	Yes	Yes	Yes	Yes	Yes	Yes
Total	7/10	8/10	5/10	7/10	6/10	5/10

Table 2: Study characteristics

Reference	**Subject**	**Methods**	**Intervention**	**Outcomes Measures**	**Data Analysis**	**PEDro Score**
Anikwe (2015) [13]	N=32	RCT	Group A – NM + Physical agents + Massage Group B – Physical agents + Massage	NRS	Mean, SD (95% CI), student t-test	5/10
Bhatia (2017) [14]	N= 38	RCT	Group A – NM + lumbar stabilization exercises Group B – lumbar stabilization exercises	NRS, RMDQ	Mean, Sd (95% CI)	8/10
Choudhary (2022) [15]	N=40	RCT	Group A – NM + conventional therapy	VAS ODI	Mean, SD, repeated measures of ANOVA	5/10
Chitra (2016) [16]	N=30	RCT	Group A – NM + TENS Group B – Kinesiotaping	VAS	Mean, SD of demographic data, student t-test	6/10
Jeong (2016) [17]	N=30	RCT	Group A – NM + lumbar segmental stabilization Group B – lumbar segmental stabilization	SF-36	Mean, SD, (95% CI) repeated measures of ANOVA	6/10
Morsi (2022) [18]	N=24	RCT	Group A – NM Group B – stretching of lower	VAS ODI	Mean, SD (95% CI), student t-test	7/10

			extremity muscles			
Plaza Manzano (2020) [19]	N=32	RCT	Group A – NM + lumbar stabilization exercises Group B – lumbar stabilization exercises	NRS RMDQ	Means, standard deviation, and 95% confidence intervals were calculated for each variable. The Kolmogorov-Smirnov test revealed a normal distribution of all the quantitative data	8/10
Tella (2022) [20]	N=32	RCT	Group A – NM + conventional exercises + massage Group B – conventional therapy + massage	NRS	Mean, SD, (95% CI) repeated measures of ANOVA	5/10
Vijaylaxmi (2022) [21]	N=23	RCT	Group A – NM + conventional treatment + hamstring stretch Group B - conventional treatment with hamstring stretch	NRS ODI	Mean, SD, (95% CI), student t-test	7/10

Ali M Alshami (2021) [22]	N=51	Prospective CT	Group A – slider NM + TENS Group B - Tension NM + TENS Group C – TENS	VAS ROM (Hip flexion in SLR, knee extension in slump)		6/10
Patel (2020) [23]	N = 52	Comparative Study	Group A – Neural tissue mobilization Group B – Muscle Energy Technique	VAS ODI SLR		5/10

RCT = Randomized Controlled Trial CT = Controlled Trial, NM = Neural Mobilization, MC = Motor control, STE = Strengthening Exercises, CI = Confidence Interval, SD = Standard Deviation

Results & Discussion

All the included articles had examined similar outcomes related to pain, disability, and function. All these article are focused on neural mobilization as a treatment.

This systematic study set out to find out how well Neural Mobilization worked for treating people with low back pain.

Neural mobilization techniques play a significant role in the management of sciatica resulting from a herniated disc with regard to pain and restoring nerve root mobility. This is consistent with the findings that nerve root is compressed and microcirculation is compromised, the pressure applied to the nerve will impact the edema and demyelination. Neural mobilization techniques consist of brief oscillatory movements that are sufficient to disperse the edema, thereby relieving hypoxia and reducing the associated symptoms. [24]

revealed that, after research on its impact on a rat model of sciatic nerve damage, neural mobilization can be utilized to reduce inflammatory mediators and, as a result, pain [25].

A another study showed when neural mobilization methods were applied to the median nerve, the C-fiber, which transmits pain signals, showed a hypoalgesic response. The authors speculate that the suppression of pain signals at the dorsal horn may be the cause of this hypoalgesic effect[26].

A study by ELDesoky et. al., states that when treating low back pain is associated with lumbosacral radiculopathy, neural mobilization therapy is a successful strategy for reducing pain, improving functional impairment, and improving the nerve root's physiological function. The results of this investigation demonstrate that neuronal mobilization is consistent with the hypothesis underlying these kinds of movements. [4] An another research by Bhatia et. al. reports that Neural mobilization can be used as a supplementary treatment to reduce pain, emhance the passive range of motion of hip flexion, minimize functional disability and improve functional independence in chronic low back radiculopathy. [20]

The VAS, NPRS, ODI, RMDQ, and SLR were the outcome measures for pain and disability in the papers that used neural mobilization as a therapy. Results from all of these studies indicate that neural tissue mobilization helps patients with radiating low back pain feel less pain and have better functional capacity.
Using the information gathered, we discovered that Neural Mobilization is helpful in lowering pain and enhancing function in patients with radiating and non-radiating low back pain over the duration of the clinical course based on the outcome measures. This review has highlighted the need and direction for future research regarding efficacy of neural mobilization as an effective treatment for low back pain.

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