



Comparative Effectiveness Of Mckenzie And Neural Mobilization Exercises In Patients With Cervical Radiculopathy

¹Logesh Ekambaram., (PhD), ² Jaya suriya S, ³Dr. P. Senthil Selvam., PhD, ⁴Lakshmi Kanth J

¹ Assistant Professor ^{2&4} MPT, ³Professor & HOD

¹School of Physiotherapy,

¹Vistas, Chennai, India

Abstract:

BACKGROUND: Radiculopathy or nerve root pain arise from disc herniation, spinal stenosis. This study focuses on disability, pain and range of motion of spine The study evaluates “The effectiveness of McKenzie technique versus neural mobilisation on reducing symptoms and disability of cervical radiculopathy.

OBJECTIVE: The purpose of the study is to compare and evaluate the effectiveness of McKenzie exercise versus neural mobilisation for the patients with cervical radiculopathy.

METHODOLOGY: This study included 30patients, they were divided into Group A and Group B. Group A given McKenzie technique and Group B given neural mobilization. Pain was assessed using Visual analogue scale (VAS), and Range of motion by goniometer.

RESULT: The results between pre-treatment and post-treatment scores of pain are considered. The mean and standard deviation are taken for both the Group A and Group B. The Group B showed better improvement in mean &standard deviation using Visual Analogue Scale, Oswestry disability index scores and Range of motion value than the Group A.

CONCLUSION: Both groups showed better improvement in reducing pain and functional disability. This study proved that Group B showed better improvement in reducing pain and reducing functional disability when compared to Group A

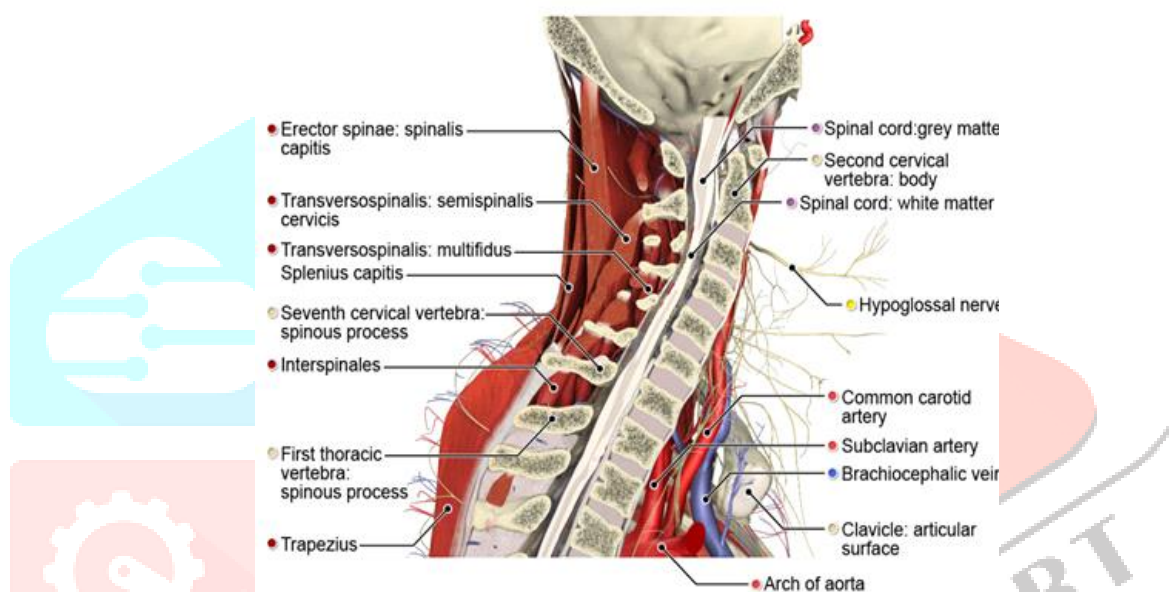
KEYWORDS: Radiculopathy, McKenzie technique, Neural mobilisation, Visual analogue scale

I. INTRODUCTION

Radiculopathy or nerve root pain occurs due to disc herniation which causes pain in the cervical and radiates down the elbow to hand. This damage is due to compression of nerve roots of the cervical spine in the level of C5-T1 this result in the tingling, radiating pain, ^[1,2].

That is 107.3 per 1,00,000 for men and 63.5 per 1,00,000 for Women. There are various surgical options available for the treatment of Cervical Radiculopathy but, it Cervical radiculopathy is a common type of neck pain involving cervical nerve root irritation which results in numbness, radicular pain and upper extremity weakness. It is caused by various factors (or) condition which include cervical stenosis, spinal degenerative changes and cervical disc herniation.

Generally cervical radiculopathy is a disorder which primarily affects spinal nerve roots which are largely caused by a space occupying lesion, disc herniation compression and bony spur in cervical spine which causes nerve root inflammation and impingement. These lesions can trigger pain receptors in the soft tissues and joints of the cervical spine in the upper extremity which results in physical and physiological symptoms. Approximately 85 persons per 1,00,000 will be affected by Cervical Radiculopathy.



is proved that conservative management will be more effective than surgical manual therapy and strengthening exercises.

Neural mobilizations had been applied in patients with various conditions such as LSP, Carpal Tunnel syndrome, Lateral epicondylalgia and Cervicobrachial pain. It will affect the axoplasmic flow, movement of the nerve and its connective tissue and the circulation of the nerve by alteration of the pressure in the nervous system and dispersion of Intra-neural edema. Nerve gliding exercises are sequence of the positioning of the upper limb (or) lower limb to elongate nerves. It is used in multiple musculoskeletal Disorders. McKenzie Method of Diagnosis and Treatment MDT is a physiotherapeutic approach that can be used for the treatment of spinal pain. Mainly for radicular symptoms. Its main component is the ability to centralize (or) decrease patient's referred pain through a series of repeated movement. Although it is shown to be effective in the treatment of Radicular symptoms. There is no conclusive evidence for the use of specific repeated motions for treating Cervical Radiculopathy. The purpose of this study was to find the effectiveness of neural mobilization and Mc Kenzie exercises on chronic neck pain patients with Cervical Radiculopathy. To prevent Cervical Radiculopathy, maintaining physical fitness and healthy diet is necessary. Maintaining good posture while doing day to day activities, taking part in sports will restrict Cervical Radiculopathy. Larger comparative studies state that other therapeutics such as Cervical orthosis and Cervical traction can be performed as an effective treatment options. Aimed Mc Kenzie exercises and Neural Mobilization technique for the Cervical region can reduce pain, disability and improve range of motion in the treatment of Cervical Radiculopathy.

2.1 Methodology

METHODOLOGY:

STUDY DESIGN: Experimental study.

STUDY POPULATION: Cervical Radiculopathy patients of age group between 30 to 70 years.

STUDY DURATION: 4 weeks.

STUDY SETTING: ISHARI MISSION HOSPITAL

SAMPLE SIZE: 30 patients.

INCLUSION CRITERIA:

- Patients aged under 60 and above 25
- Both male and female patients were chosen
- Patients with mild to moderate pain were included

EXCLUSION CRITERIA:

- Patients with Hypermobility were excluded
- Patients with the history of osteoporosis and osteopenia.
- Patients with ALAR ligament insufficiency were excluded
- Patients with recent injuries were excluded
- Chronic cervical radiculopathy patients who were referred for surgery were excluded.

PROCEDURE:

- Thirty patients were chosen for the experiment before it began based on the inclusion and exclusion criteria and their informed consent was obtained
- Patients were divided into two groups of 15 members each of group A-NEURAL MOBILISATION group B -MCKENZIE EXERCISES.
- Patients were evaluated on the first day and reassessed after 4 weeks till the treatment ended.
- During four weeks the patients were made to do neural mobilisation and McKenzie exercises according to their allotted randomised group.
- Participants pain rating values and ROM values were assessed after 4-week sessions. statistics were used to analyse the pre-test and post-test values.

NEURAL MOBILISATION (GROUP A):

In this group neural mobilization technique with sliding of the median nerve was applied in 1 set of 10 repetitions with 3 seconds hold in each repetition. Neural mobilization was done according to the technique described by David Butler. The subject was placed in supine position with the shoulder in abduction and lateral rotation; elbow in extension, forearm in supination and wrist, finger and thumb in extension position (**fig :1**) then finally, to apply the stretch shoulder was taken in greater abduction and cervical spine in contralateral side flexion. This was repeated for 4 weeks.



NEURAL MOBILIZATION

MCKENZIE EXERCISES (GROUP B)

In this group McKenzie exercises for the session include McKenzie cervical retractions with cervical extension to promote centralisation and McKenzie cervical retractions with self-overpressure both exercises were applied in 3 set of 15 repetitions each. this was repeated for 4 weeks.



CERVICAL RETRACTION



CERVICAL RETRACTION WITH OVERPRESSURE

RESULTS:

In Table 1, On comparing mean values of GROUP-A and GROUP-B on Visual Analogue Scale shows highly significant improvement in the post-test mean but GROUP-B (3.1333) shows lesser mean value is more effective than GROUP-A (5.9333) at $P \leq 0.001$, Hence the null hypothesis is rejected.

In Table 2, On comparing mean values of GROUP-A and GROUP-B on range of motion score shows highly significant improvement in the post-test mean but GROUP-B shows greater mean value is more effective than GROUP-A at $P \leq 0.001$, Hence the null hypothesis is rejected.

In Table 3, On comparing Mean Values of Visual Analogue Scale, Range of motion scores Between pre-test and post-test within the Group-A and Group-A shows highly significant difference at $p \leq 0.001$. Hence the null hypothesis is rejected.

In Table 4, On comparing Mean Values of Visual Analogue Scale Range of motion scores Between pre-test and post-test within the Group-A and Group-B shows highly significant difference at $p \leq 0.001$. Hence the null hypothesis is rejected.

DISCUSSION:

Cervical radiculopathy is a clinical syndrome, that often-affected persons are unable to perform their social obligations, do physical tasks pertinently, and lose working hours. In literature for cervical radiculopathy many non-surgical treatment options are discussed and multimodal conservative approach has been proven to be more effective in improving the symptoms. Subjects with cervical radiculopathy show deconditioning of cervical muscles due to inactivity. Exercises are shown to be beneficial in improving well-being of a person and reducing disability.

These has also shown to improve sleep, emotional and physical functioning, cognitive functioning, and reducing depression or anxiety. In present study neural mobilization McKenzie cervical exercises of cervical muscles. This showed results in consistent with Liang et al, as it showed improvement in range of motion of cervical spine and reduction in pain.

Past studies show the moderate benefit of these exercises in reducing pain and improving strength in patients with cervical radiculopathy. Exercises promote analgesic effect in musculoskeletal pain, as shown in the study of Lima et al exercises can reduce the hyperalgesia in muscle pain or after an injury. These results are correlate with the present study as reduction in pain is observed in both groups. This exercise-induced hypoalgesia or analgesia predicts greater pain relief and improvement in cervical functioning by restoring muscular balance through strengthening cervical muscle exercises, this in turn impacts the quality of life positively, enhancing independence and reducing disability The McKenzie Method of Diagnosis and Treatment (MDT) is an approach of PT that can be used for the treatment of spinal pain, especially with associated radicular symptoms.

A vital component of MMDT is the ability to centralize or decrease the patient's referred or radicular symptoms through a series of repeated movements. Although the concept of repeated motions and centralization have been shown to be effective in treating radicular symptoms associated with the lumbar spine, evidence is inconclusive for the use of specific, repeated motions for treating cervical radiculopathy According to the 2008 Neck Pain Clinical Practice Guideline (CPG) of the American Physical Therapy Association, "specific repeated movements or procedures to promote centralization are not beneficial in reducing disability when compared to other forms of interventions". In the 2017 revision of the Neck Pain CPG, the recommendation for treating neck pain with radiating pain is a multimodal approach utilizing "mechanical intermittent cervical traction, combined with other interventions such as stretching and strengthening exercises plus cervical and thoracic mobilization/manipulation-----". The current literature is conflicted on the benefits of MMDT for cervical pain. One study demonstrated that McKenzie exercises involving repeated movements did not demonstrate significantly superior outcomes compared to general exercise and a control group at long-term follow-up (12 months), but did show more rapid improvement in pain symptoms in the short-term (three weeks)) Addition of McKenzie Exercises to a Multimodal Physical Therapy Approach for Cervical Radiculopathy: A Case Report. long-term outcomes are seen among other studies that involve multimodal treatments and are not specific to studies regarding McKenzie exercises.

In present study an effort has been made to consider all the elements of high-quality evidence so knowledge base could be improved about the effective treatment options for cervical radiculopathy. However, further research is required focusing on reducing the variability in patient selection in clinical trials, which will further optimize clinical practice. Therefore, there are a few limitations in this study that may affect the results and should be considered in future studies. First, when given combined treatment it is often times difficult to interpret the result of a single intervention. Second, subjective or objective measurement of upper limb pain and numbness due to radiculopathy were not included. Third, the sample was collected only from one clinical setting so results cannot be generalized. Fourth, this study is biased in using neural mobilization technique on median nerve, therefore this technique may not be useful for participants with cervical radiculopathy at other cervical spinal levels. Fifth, long term effects should be evaluated in future studies.

CONCLUSION:

Both groups showed better improvement in reducing pain and Increasing Range of Motion. GROUP-B showed better improvement in reducing pain and Range of Motion. When compared to GROUP-A The subjects of both groups showed improvement in their VAS, ROM. But Group B showed statistically more improvement when compared to Group A. McKenzie technique is significant in decreasing pain, improving functional ability, and increasing neck range of motion in patients with cervical radiculopathy. However, we conclude that MECKENZIE TECHNIQUE is more effective than NEURAL MOBILISATION TECHNIQUE in cervical Radiculopathy in terms of reducing pain and increasing Range of Motion.

TABLE 1: COMPARISION OF VISUAL ANALOGUE SCALE BETWEEN GROUP A AND GROUP B IN PRE-TEST AND POST -TEST

VAS	GROUP A		GROUP B		t-TEST	SIGNIFICANCE
	MEAN	S. D	MEAN	S. D		
PRE TEST	7.9333	.88372	7.6000	.98561	0.9751	0.3378
POST TEST	5.9333	.79881	3.1333	.91548	8.9255	0.0001

The above table reveals the Mean, Standard Deviation (S.D), t-test and p-value of the Visual Analogue Scale score between (Group A) & (Group B) in pre-test and post-test.

This table shows that there is no significant difference in pretest values of the Visual Analogue Scale score between Group A & Group B (*P > 0.05).

This table shows that there is a significant difference in post-test values of the Visual Analogue Scale score between Group A & Group B (**P ≤ 0.001).

Both the group shows significant decrease in the post-test means but (GROUP-B) which has the lesser mean value is more effective than (GROUP-A).

TABLE 2: COMPARISON OF RANGE OF MOTION SCORE BETWEEN GROUP – A AND GROUP – B IN PRE-TEST AND POST TEST

ROM		GROUP A		GROUP B		t-Test	significance
		MEAN	S. D	MEAN	S. D		
Cervical Flexion	PRE TEST	11.4667	2.74816	16.1333	8.34837	2.0564	0.0492
	POST TEST	20.8000	3.60951	40.0000	7.94625	8.5202	0.0001
Cervical extension	PRE TEST	34.6667	7.89816	28.0000	5.60612	2.6658	0.0126
	POST TEST	53.0000	5.60612	68.0000	4.84031	7.8437	0.0001
Cervical lateral flexion (right)	PRE TEST	13.2667	5.49632	10.8000	3.89505	1.4182	0.1672
	POST TEST	24.6667	6.39940	36.3333	3.97612	5.9972	0.0001
Cervical lateral flexion (left)	PRE TEST	10.6000	3.85079	11.2000	3.52947	0.4449	0.6598
	POST TEST	20.6000	4.68737	34.2667	3.63449	8.9239	0.0001
Cervical rotation(right)	PRE-TEST	18.6667	3.51866	22.2667	4.78788	2.3466	0.0263
	POST TEST	38.8000	5.55749	68.1333	5.55320	14.4604	0.0001
Cervical Rotation(left)	PRE-TEST	19.8000	4.91644	19.4000	3.66060	0.2527	0.8023
	POST TEST	39.0000	8.49370	67.6667	4.95215	11.2924	0.0001

The above table reveals the Mean, Standard Deviation (S.D), t-test and p-value of the Range of Motion Score between (Group A) & (Group B) in pre-test and post-test.

This table shows that there is no significant difference in pre-test values of the Range of Motion score between Group A & Group B (*P > 0.05).

This table shows that there is a significant difference in post-test values of the Range of Motion score between Group A & Group B (**P ≤ 0.001).

Both the group shows significant decrease in the post-test means but (GROUP-B) which has the Greater mean value is more effective than (GROUP-A).

**TABLE 3:
COMPARISON OF VISUAL ANALOGUE SCALE, RANGE OF MOTION SCORES BETWEEN
PRE-TEST AND POST TEST WITHIN GROUP – A**

GROUP A	PRE - TEST		POST - TEST		t-test	significance
	MEAN	S. D	MEAN	S. D		
Visual Analogue Scale	7.9333	.88372	5.9333	.79881	6.5024	0.0001
Cervical flexion	11.4667	2.74816	20.8000	3.60951	7.9680	0.0001
Cervical extension	34.6667	7.89816	53.0000	5.60612	7.3310	0.0001
Cervical lateral flexion (right)	13.2667	5.49632	24.6667	6.39940	5.2339	0.0001
Cervical lateral flexion(left)	10.6000	3.85079	20.6000	4.68737	6.3844	0.0001
Cervical rotation (right)	18.6667	3.51866	38.8000	5.55749	11.8545	0.0001
Cervical rotation (left)	19.8000	4.91644	39.0000	8.49370	7.5771	0.0001

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group – A.

There is a statistically highly significant difference between the pre-test and post-test values of Visual Analogue Scale, Range of Motion scores within Group - A (*- P ≤ 0.001).

TABLE 4: COMPARISON OF VISUAL ANALOGUE SCALE, RANGE OF MOTION SCORES BETWEEN PRE-TEST AND POST TEST WITHIN GROUP –B

GROUP B	PRE – TEST		POST - TEST		t-test	significance
	MEAN	S. D	MEAN	S. D		
Visual Analogue Scale	7.6000	.98561	3.1333	.91548	12.8603	0.0001
Cervical flexion	16.1333	8.34837	40.0000	7.94625	8.0200	0.0001
Cervical extension	28.0000	5.60612	38.0000	4.84031	5.2291	0.0001
Cervical lateral flexion right(right)	10.8000	3.89505	36.3333	3.97612	17.7666	0.0001
Cervical lateral flexion(left)	11.2000	3.52947	34.2667	3.63449	17.6338	0.0001
Cervical rotation (right)	22.2667	4.78788	68.1333	5.55320	24.2273	0.0001
Cervical rotation (left)	19.4000	3.66060	67.6667	4.95215	30.3555	0.0001

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value between pre-test and post-test within Group – B.

There is a statistically highly significant difference between the pre-test and post-test values of Visual Analogue Scale, Range of Motion scores within Group - B (*- $P \leq 0.001$).

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ETHICAL CLEARANCE: Nil

CONFLICT OF INTEREST: Nil

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