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Effects of Neural Mobilization with and without Cervical Lateral Glide on Pain, Range of Motion and Functional Disability in Patients with Cervical Radiculopathy

Sobia Nawaz[1], Filza Shaukat[2], Mariam Liaquat[3], Ramesha Tahir[4], Akash Ahmad[5], Maria Shahzad[6]

[1]Senior Physiotherapist at Allied Hospital, Faisalabad, Pakistan
[2]Assistant Professor at The University of Lahore, Lahore, Pakistan
[3]Senior Lecturer at The University of Lahore, Lahore, Pakistan
[4]Physiotherapist at Shifa Home Healthcare Dubai, UAE
[5]Student at The University of Lahore, Lahore, Paksitan
[6]Student at Riphah International University, Lahore, Pakistan

Author`s Contribution

[1]Conception and design, Collection and assembly of data, [2]Analysis and interpretation of the data, [3]Drafting of the article, [4]Critical revision of the article for important intellectual content, [5]Statistical expertise, [6] Final approval and guarantor of the article Info.

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Address of Correspondence

Sobia Nawaz
sobiaaliawaz@gmail.com
ORCID: 0009-0003-0111-6996

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ABSTRACT

Background: Cervical radiculopathy is the entrapment of the cervical nerves results in a clinical condition. Numerous clinical indications, such as discomfort, sensory deficits, motor deficits, reduced reflexes, and any of the combinations might be caused by cervical radiculopathy.

Objective: To determine the effects of neural mobilization with and without cervical lateral glide of pain, range of motion and functional disability in patients with cervical radiculopathy

Methodology: Nine Months duration of randomized clinical trial study done in Physiotherapy Department OPD of Allied Hospital, Faisalabad. 86 cervical radiculopathy patients divided into two equal groups using the Numeric Pain Rating Scale pain score as the outcome measure. The SPSS program version 25 was used for data administration and analysis. Convenient sampling technique was used. Both genders of age of 25 to 45 were included. Tumors, fractures, rheumatoid arthritis, osteoporosis, and extended steroid use were excluded. The routine physical therapy, neural mobilization along with cervical lateral gliding administered to Group A subjects. Group B received neural mobilization with routine physical therapy. Data was collected on the baseline, 2nd week and then at 4th weeks. Numeric pain rating and neck disability index, Goniometer was used for assessment.

Results: Both genders of age of 25 to 45 for between group analysis independent sample t-test used which shows there was a significant difference in before and after intervention as p-values of all outcome measures were less than 0.05 in post-intervention. Repeated measure ANOVA was used for within group comparison which shows both groups show effectiveness but group A shows more significant results as their mean differences is more than group B.

Conclusion: It is concluded that both techniques are effective but incorporating cervical lateral glides into neural mobilization has yielded more significant results in this study.

Keywords: Cervical radiculopathy, pain, range of motion and functional disability, neural mobilization.

Introduction

The entrapment of the cervical nerves results in a clinical condition known as cervical radiculopathy.[1] Cervical radiculopathy was predisposed to white race, smoking, and prior radiculopathy of the lumbar region.[2]

An effective therapeutic method for treating cervical radiculopathy is neural mobilization. The goals of neural mobilization are to improve mobility, alleviate discomfort, and restore normal nerve function. Studies have looked at how neural mobilization, frequently used in conjunction with other therapies, affects cervical radiculopathy.[3] According to

research, neural mobilization can result in improved outcomes, such as decreased pain, increased range of motion, as well as decreased disability, when combined with manually cervical traction and conservative therapies. These data show that neural mobilization has the potential to be an effective strategy in the holistic care of cervical radiculopathy, enhancing patient outcomes as well as quality of life.[4]

Cervical radiculopathy poses a significant health burden with pain, limited range of motion, and neck disability. This study investigates the differential impact of neural mobilization techniques, both with and without cervical lateral glide, on these outcomes. In the future, this study holds significant promise for physiotherapists and students in the field. By providing insights into the relative benefits of neural mobilization techniques, the research equips physiotherapists with a more comprehensive understanding of treatment options for cervical radiculopathy. This knowledge will enable them to make more informed decisions when devising personalized intervention plans. Additionally, students stand to gain a solid foundation in evidence-based practice, as they can incorporate the findings of this study into their academic learning. Overall, this research has the potential to enhance clinical decision-making, contribute to improved patient care, and facilitate the professional growth of both practicing physiotherapists and aspiring students.

Methodology

Randomized Control Trial was conducted at Physiotherapy department of Allied hospital Faisalabad after the Nine months approval of synopsis. From Open epi tool the number of sample size were 36+7=43 in each of the groups used the NPRS pain score as the outcome measure by Convenient sampling technique was used. [5] The rights of the study's subjects shall be respected, and the ethical guidelines established by The University of Lahore's ethics committee provided with ref no **(REC-UOL-449-07-2023)**

Inclusion Criteria: Age ranges from 25 to 45, both Genders combined, Participants who had already received a diagnosis of cervical radiculopathy from a neurosurgeon.[6], An NPRS pain score of at least 2.[7], Lessened cervical active ROM in terms of side bending, rotation, and extension.[8], Less than a 10-point Neck Disability Index scoring.[9]

Exclusion Criteria: Previous cervical or thoracic spine surgery.[10], Those who suffer from vertigo or the veribrobasilar disease.[10], "Red Flag" indicators, such as tumours, fractures, rheumatoid arthritis, osteoporosis, and extended steroid use.[10], People who have cervical spinal stenosis.[11], An incident or injury within the past 14 days.[11]

Electrotherapy, a home exercise program for the neck, and brachial plexus neural mobilization will make up the initial course of treatment.

The baseline procedure and cervical lateral gliding were administered to Group A subjects.

The patient were resting on his back, his shoulders slightly abduction by a few degrees of medial rotation, and his elbows flexed to roughly 90 degrees. Hands would be at the subject's chest or abdomen. The physiotherapist was gently stabilize the shoulder over the acromial joint with one hand while holding the other over the head and neck. The technique entails gliding lightly and slowly in the direction opposite the hurting spot. In 5 consecutive applications, cervical lateral gliding were performed continuously for two minutes, with one minute of relaxation in between each two-minute application.[12]

Subjects in Group B were only receive baseline treatment, which includes cervical exercises at home (neck rotation, chin tuck, tilted forward, neck extension)[13], neural mobilization of the brachial plexus [14.15]

The SPSS program version 25 was used for data administration and analysis. Data was normally distributed which we were examined by using the Kolmogorov Smirnov test. Parametric test was applied which were independent sample t-test for between group studies and repeated measure ANOVA for within group studies.

Results

The mean age, accompanied by the standard deviation (SD), for group A is 35.32±6.016, while for group B, it is 36.83±4.81. In group A, the proportion of male individuals is 9.3%, whereas in group B, it rises to 32.6%. Conversely, the female cohort constitutes 90.7% of group A and 67.4% of group B.

Table I: TEST OF NORMALITY

Kolmogorov smirnov test			
Variables		Statistics	Sig.
NPRS	Group A	.910	.083
	Group B	.912	.102
NDI	Group A	.974	.260
	Group B	982	.180
Cervical flexion	Group A	.976	.170
	Group B	.935	.108
Cervical extension	Group A	.952	.071
	Group B	.974	.164
Cervical right lateral flexion	Group A	.973	.178
	Group B	.920	.202
Cervical left lateral flexion	Group A	.963	.065

	Group B	.961	.140
Cervical right rotation	Group A	.979	.189
	Group B	.977	.264
Cervical left rotation	Group A	.975	.246
	Group B	.965	.104
BBS at 16th weeks	Group A	.909	.101
	Group B	.945	.103

Rating Scale

Table II: Independent Sample t-Test for Numeric Pain

	Study Groups		
Numeric pain rating scale	**Group A**	**Group B**	**P-value**
Baseline	7.62±0.95	7.60±0.97	0.91
At 2nd week	5.44±7.45	6.39±.0.79	0.40
At 4th week	2.00±1.04	5.75±1.31	0.00

REPEATED MEASURE ANOVA IN BOTH GROUPS

Multivariate effects /NPRS and groups	Value	F	Hypothesis df	Error df	sig
Pillai's trace	0.84	224.336	2.000	83.000	0.00
Wilks lambda	0.15	224.336	2.000	83.000	0.00
Hotelling's trace	5.40	224.336	2.000	83.000	0.00
Roy's largest root	5.40	224.336	2.000	83.000	0.00

TEST OF WITHIN SUBJECT EFFECTS

Source	**N**	**Df**	**Mean square**	**Type III sum of square**	**Sig**

Table III: Independent Sample t-Test for Neck Disability

	Study Groups		
Neck disability index	**Group A**	**Group B**	**P-value**
Baseline	44.62±2.91	43.93±2.53	0.24
At 2nd week	29.18±3.17	39.69±2.92	0.00
At 4th week	20.32±2.77	35.48±7.10	0.00

REPEATED MEASURE AVONA IN BOTH GROUPS

Groups	114.84	1	152.581	152.581		0.000
Multivariate effects /NDI and groups		Value	F	Hypothesis df	Error df	sig
Pillai's trace		0.92	515.523	2.000	83.000	0.00
Wilks lambda		0.75	515.523	2.000	83.000	0.00
Hotelling's trace		12.42	515.523	2.000	83.000	0.00
Roy's largest root		12.42	515.523	2.000	83.000	0.00

TEST OF WITHIN SUBJECT EFFECTS

Source	**f**	**Df**	**Mean square**	**Type III sum of square**	**Sig**
Groups	122.38	1	1432.58	2865.17	0.000

Discussion

Cervical radiculopathy presents as a pervasive disorder that causes pain, decreased ability to function and a lower quality of life. The discussion that follows goes into the findings of a research that looked at the impact of neural mobilization with and without cervical lateral glide on pain, ROM, and functional impairment in individuals with cervical radiculopathy. We wanted to understand the usefulness of these particular treatment options in improving patient outcomes by conducting an in-depth research and comparison with data from related research studies.

The demographic characteristics of the study population play a pivotal role in contextualizing the results. In the present study, participants were divided into Group A and Group B, with distinct mean ages and gender distributions. Group A exhibited a mean age of 35.32±6.016, while Group B had a mean age of 36.83±4.81. Furthermore, Group A comprised 9.3% males and 90.7% females, while Group B consisted of 32.6% males and 67.4% females. These demographics set the foundation for understanding the study population's composition.

A research by [16] investigated the impacts of neural gliding exercises in radiculopathy patients. While no particular demographic information were given, the condition's frequency across multiple age groups and genders suggests potential parallels with the sample of our current research.

The meta-analysis and systematic review conducted by[17] included a variety of research, such as those examining cervical neuromobilization treatment. Their findings validated the effectiveness of this therapy in decreasing pain, correlating with the current study's focus on pain reduction via neural mobilization.

A study by[18] investigating neurodynamic mobilization and TENS effects, shares the emphasis on pain reduction. Although the interventions vary, the shared commitment to pain relief underscores the relevance of both studies' outcomes.

Although different, [19] examination of neural mobilization for radicular lumbar back pain provides facts about the broad application of pain relief. The decrease in lower back pain found in their study might be compared to the findings of the current investigation to illustrate the potential broader application of neural mobilization therapies.

Range of motion (ROM) is a critical indicator of functional improvement in cervical radiculopathy. Our study's outcomes indicated significant enhancements in cervical flexion and extension over the intervention period. In my study, the mean

cervical flexion at baseline was 11.72±5.18 for Group A and 10.76±3.84 for Group B. By the 2nd week, Group A's mean flexion increased to 30.02±5.93, while Group B's mean flexion was 18.65±2.09. At the 4th week, Group A exhibited a mean flexion of 45.37±3.81, while Group B had a mean flexion of 22.74±5.28.

Regarding cervical extension, the baseline means were 27.30±6.46 for Group A and 27.16±6.12 for Group B. By the 2nd week, Group A's mean extension rose to 46.74±7.55, and Group B's mean extension was 33.60±5.69. At the 4th week, Group A demonstrated a mean extension of 75.53±4.65, while Group B reported a mean extension of 39.46±5.95.

The findings done by [16] investigation have no direct relationship to ROM. Their particular focus on neural gliding exercises, on the other hand, shows a possible influence on ROM improvements in radiculopathy participants, which is in accordance with the topic of our study.[20] focused on neurodynamic mobilization and cervical traction, which might lead to nerve root compression. Although no ROM results were given, the therapies' objective to relieve nerve compression implies that ROM improvements may be possible in their study group.

The study [19] using neural mobilization for radicular lower back pain provides insight into the possibility for ROM improvements. While every scenario is unique, the notion of increasing ROM is fundamental. The increased ROM seen in their study might be compared to the results of the current investigation to illustrate the potential broader application of neural mobilization therapies.

Improving functional impairment is critical to recovering patients' quality of life. The findings of our study revealed significant improvements in functional impairment, as measured by the Neck impairment Index (NDI), over the intervention period.

At baseline, the mean NDI for Group A was 44.62±2.91, and for Group B it was 43.93±2.53. By the 2nd week, Group A's mean NDI decreased to 29.18±3.17, while Group B's mean NDI increased to 39.69±2.92. Finally, at the 4th week, Group A exhibited a mean NDI of 20.32±2.77, while Group B reported a mean NDI of 35.48±7.10. These outcomes underscore a substantial enhancement in functional disability over the intervention period.

When these findings are compared to those from linked papers, they give significant insights.

Conclusion

Effective methods are shown by the investigation of neural mobilization for cervical radiculopathy with and without cervical lateral glide. Pain relief, functional impairment, and increased mobility are highlighted by the study. The general trend suggests that favorable patient outcomes are achievable despite variations in demographics. Further, more noteworthy outcomes in this investigation have been obtained by combining cervical lateral glides with neural mobilization.

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