

# Effects of Stabilization Exercises on Pain and Functional Status in Cervical Radiculopathy

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## ABSTRACT

**Objective:** The objective of this study was to identify the effects of stabilization exercises on pain and functional status in patients of cervical radiculopathy.

**Methodology:** The study was a Quasi experimental trial and was conducted in outpatient department of Ittefaq Hospital Lahore. The patients (n=44), who met the inclusion criteria were divided into 2 groups. Group A (n=22) was treated with stabilization exercises and conventional physical therapy protocol whereas group B (n=22) was given conventional physical therapy protocol only. Patients were evaluated with DASH score and NPRS for functional assessment and pain respectively at baseline and after 3 weeks of treatment in both groups. Data was analyzed on SPSS 21.

**Results:** Mean age of patients in group A (Experimental group) and group B (Conventional group) were 54.22± 4.96 and 51.95±4.21 respectively. Within the group comparison for NPRS and DASH scores were statistically significant with p values <0.05. P values for across the group comparison were 0.40 and <0.05 for DASH and NPRS score respectively.

**Conclusion:** The current study concludes that stabilization exercises along with conventional physical therapy and conventional physical therapy alone, both are effective in improving pain intensity and functional status in patients with cervical radiculopathy. However stabilization exercises are more effective in reducing the pain intensity levels.

**Keywords:** Cervical radiculopathy, Neck pain, Stabilization exercise, Disability

## INTRODUCTION

Different schools of thought have come up with different definitions of Cervical Radiculopathy. Among them the definition that has been put forth by The North American Spine Society (NASS) states that pain that occurs in a radicular pattern either in one or both upper extremities. This pain may occur either due to irritation or compression of any of the nerve roots involved within the cervical region. (1, 2) Primarily, CR can be a consequence of inflammation or impingement of any nerve root in the neck region which can be caused by multiple reasons such as a lesion that occupies space and ultimately decreases the size of the intervertebral foramen. (3) Frequently, the causes of reduction in the size of the intervertebral foramen include herniation of a cervical disc or degeneration of facet joints in the neck. (4) Furthermore, the main causes of CR might include a disc herniation or osteophyte formation. A disc herniation may typically result in inflammation thus causing compression of the involved nerve root. This compression ultimately leads to occurrence of radicular symptoms within the involved extremity. The nature of the symptoms that occur are variable depending upon the involvement of the nerve root. Motor, sensory or autonomic branches of the peripheral nerves may be concerned. (5)

Epidemiological surveys suggest that annually the incidence rate of CR is estimated as 83 per 100000 for the entire population. Surveys also recommend that an increased prevalence occurs in the fifth and sixth decade of life where the figures reach up to 203 cases per 1 00 000. CR is more common in the male population as compared to females. (3)

Physiotherapists frequently treat patients suffering from cervical radiculopathy in their daily practice. A study concluded that 26% patients suffer through high levels of pain even after the surgical procedure has been performed. (6) Other researchers conclude that patients who opt for conservative treatment show better outcomes as compared to those patients who undergo surgical procedures. (7) Manual therapy also plays a key role in the treatment of CR. MT further comprises of multiple techniques such as manipulation i.e. a high velocity thrust, low velocity mobilization techniques for the cervical or/and thoracic spine, muscle energy techniques, cervical traction, neural mobilization techniques and soft tissue mobilization techniques. (8, 9) Neck stabilization exercises and dynamic exercises both are very

effective when it comes to managing nonspecific neck pain however it is still unclear that which group demonstrates better outcomes. Nonspecific neck pain is defined as pain whose underlying cause is unidentified and can present in a radiating or non-radiating manner. (9, 10)

## METHODOLOGY

A Quasi-experimental trial was conducted at Ittefaq Hospital Lahore from Aug 2019 – Jan 2020. Both genders aged between 45-60 years having neck pain for at least one month with positive spurling, distraction and upper limb tension tests and dermatomal distribution of arm pain were included in the study. The patients with red flags, previous cervical or thoracic surgery, local steroid injection and vertebrobasilar insufficiency were excluded. The consecutive sampling technique was used. Disabilities of the Arm, Shoulder and Hand (DASH) score and Numeric Pain Rating Scale (NPRS) were used as data collection tools. The sample of 44 patients was selected by using Epitool sample size calculator. The sample was divided into two groups; Group A (Experimental group) and group B (Conventional group). For conventional group, Ultrasound was applied to the patients for 5 minutes with a frequency of 1.5 MHz, Intensity of 1.4 W/cm<sup>2</sup>, at continuous mode. The session also included some stretching exercises of trapezius, sternocleidomastoid, Scalena, levator scapulae, pectorals and biceps. Each stretch was performed by the therapist once in a day, 3 times per session and was held for at least 10 to 15 seconds. The experimental group was treated with Stabilization exercises in addition to the conventional physiotherapy. The stabilization exercises include cervical flexion-dynamic isometric exercises in sitting position, Cervical extension-dynamic isometric exercises in sitting position, Shoulder shrugs, Bicep curls and Bench press. The number of repetitions was gradually increased as the patients progressed. Starting with 5 the number of repetitions was taken up to a maximum of 15 for each exercise. Similar exercises were taught to all patients as home plan. Three sessions of treatment per week for three weeks were given. Pre and post treatment evaluations were done through DASH score and NPRS. Pretreatment scores were taken before the start of the treatment whereas post treatment scores were taken after third week of treatment.

During 1st visit a complete physical examination, history and thorough assessment was done by the researcher. The patients were requested to complete DASH and NPRS questionnaire. Treatment was then continued to the selected subjects according to their allocation in the relevant groups. Total three sessions of treatment per week for three weeks were given. At the end of week 3 post treatment evaluation through DASH score and NPRS was done.

SPSS for windows software, version 21 was used to analyze the data. Frequency tables were used to show summary of group measurements measured over time. Paired sample t test was used to show change of subjective as well as objective measurements over time while Independent sample t test was used to show the difference between the groups.

## RESULTS

A total number of 44 patients were part of this study. They were divided into 2 groups, the experimental group and the conventional group. Both groups contained 22 patients. The mean age of the participants in experimental group vs. conventional group was 54.22±4.96 vs. 51.95±4.21 years respectively (Table-I).

The pre treatment mean value for functional outcome on the DASH score for experimental group was 39.59 whereas the post treatment mean was 27.27. The mean difference was 12.31 + 1.39 with a p value <0.001. Similarly, the pre treatment mean of conventional group was 38.09 whereas the post treatment mean was 32.54. The mean difference was 5.55 + 1.22 with a p value <0.001. The p values indicate that the results for both groups were statistically significant. The pretreatment mean NPRS of experimental group was 7.09 whereas the post treatment mean NPRS was 2.50. The mean difference was 4.59+ 0.95 with a p value <0.05. In the same way, the pretreatment mean of conventional group was 6.95 whereas the post treatment mean was 4.95. The mean difference was 2.00+ 0.87 with a p value <0.05. The p values indicate that the results for both groups were statistically significant (Table-II).

Table-1: Demographics of Participants

Variable	Group A Experimental group	Group B Conventional group
Gender	N (%)	N (%)
Male	12 (54.5%)	7 (31.8%)
Female	10 (45.5%)	15 (68.2)
Total	22 (100%)	22 (100%)
Mean±S.D		
Age (year)	54.22± 4.96	51.95±4.21
Height (Meter)	1.66±0.10	1.66±0.09
Weight (Kg)	65.13±11.56	69.59±11.97
BMI (kg/m <sup>2</sup> )	23.33±3.04	25.12±4.26

Table-2: Within group pair wise comparison of DASH and NPRS

	Group A Experimental group		Group B Conventional group	
Pre Treatment DASH	39.59		38.09	
Post Treatment DASH	27.27		32.54	
	Mean difference	P value	Mean difference	P value
Pre Treatment DASH – Post Treatment DASH	12.31	< 0.001	5.55	< 0.001
Pre Treatment NPRS	7.09		6.95	
Post Treatment NPRS	2.50		4.95	
	Mean difference	P value	Mean difference	P value
Pre Treatment NPRS – Post Treatment NPRS	4.59	< 0.05	2.00	< 0.05

The mean difference of DASH before the treatment was 1.50 with a p value of 0.57. However, the mean difference after the treatment was 5.27 with a p value of 0.40 which is greater than 0.05. This p value indicates that the results were not statistically significant and both groups attained equal relief in terms of function on the DASH score. Before the treatment the mean difference of

NPRS was 0.13 with a p value of 0.67 which was not statistically significant. After the treatment the mean difference was 2.45 with a p value of <0.001. This shows that the levels of pain intensity on the NPRS improved significantly after the treatment and the treatment also proved to be effective for the patients (Table-III).

Table-3: Across the group comparison of DASH and NPRS score

	Mean Difference	Significance
Pre Treatment DASH score	1.50	0.57
Post Treatment DASH score	5.27	0.40
Pre Treatment NPRS score	0.13	0.67
Post Treatment NPRS score	2.45	<0.001

## DISCUSSION

A large number of patients are encountered by the physical therapists in their departments as a result of neck pain. Cervical pain can be caused due to a multiple number of reasons. The current study focused upon patients suffering from neck pain as a result of cervical radiculopathy. This study was conducted to check whether the addition of stabilization exercises to a standardized physical therapy protocol created any beneficial effects in terms of improving pain and functional status among the patients or not. Results of the current study support the use of stabilization exercises. These exercises not only proved to be beneficial for lowering the intensity of pain on NPRS but were also helpful in terms of improving the functional outcomes on the DASH score.

Bashir et al enrolled 89 patients in his study who were diagnosed with nonspecific neck pain. Ages of the patients ranged from 22 to 65 years. The patients were included only if they had been suffering neck pain since 6 weeks. Treatment was given to 3 groups of patients. The first group was treated with dynamic exercises; the second group of patients was treated through stabilization exercises whereas the third group was treated with a combination of both approaches. Results showed that all 3 treatment approaches brought betterment in the levels of pain, anxiety and depression however, patients who were treated with stabilization exercises only showed marked differences in their pain levels as compared to the other groups.(11) Whereas, the current study was conducted on a patient population diagnosed with cervical radiculopathy with a sample size of 44, ages between 25 to 60 years and suffering pain in the cervical region since a month at least. Results of the current study support that the levels of pain were significantly lower on NPRS in patients who were treated with stabilization exercises. Thus, results of the above mentioned study were in favor of the current study.

Nihal and Hakan found in their study that an interventional regime consisting of physical therapy, postural alignment and education along with stabilization exercises showed significant results within the groups after 12 weeks. (12) The current study was summed up after 3 weeks. Pair wise comparison of DASH score and NPRS were consistent with the above mentioned study as they were statistically significant.

Turkan et al in his study found that the combination of manual therapy and stabilization exercises was more effective for patients with mechanical neck pain that was nonspecific in nature.(13) The study was a randomized controlled trail whereas the current study was a quasi-experimental trial. Cervical and scapular mobilizations were given to the patients according to Maitland and Cyriax techniques. In contrast to the current study, the previous study demonstrated that functional outcome measured on NDI was significant in patients who received a combination of manual therapy and stabilization exercises as manual therapy was not part of the current study. Levels of pain also improved more in the group who received a combination of SE and MT which is again not in favor of the current study.

Yesim et al found that stabilization exercises were superior to isometric and stretching exercises in terms of relieving pain and disability in the cervical region. (14) Pain was accessed on the visual analog scale and the disability scores were recorded on the Neck Disability Index. Contrary to this the outcome measure tools

of the current study were DASH score for disability and NPRS for pain intensity. Yesim recorded the baseline readings before the treatments were applied and post treatment readings were taken at month 1,3,6,9 and 12. The study compared long term effects of stabilization exercises, isometrics and stretching exercises, whereas the current study was summed up after 3 weeks where pretreatment readings were taken as baseline measurements and post treatment readings were taken after week 3. Results of the study favor the current study as improvements were seen in patients who received SE in their treatment.

## CONCLUSION

The current study concludes that stabilization exercises along with conventional physical therapy and conventional physical therapy alone, both are effective in improving pain intensity and functional status in patients with cervical radiculopathy. However, stabilization exercises are more effective in reducing the pain.

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