

# Effects of Mobilization and Exercise on Neck Muscular Spasm and Pain

Muhammad Tariq Rafiq<sup>1,\*</sup>, Zahoor Elahi<sup>2</sup>, Shafqat Perveen<sup>3</sup>, Nazia Jabeen<sup>1</sup>

<sup>1</sup>Physiotherapy Department, Nawaz Sharif Social Security Teaching Hospital, Lahore, Pakistan

<sup>2</sup>Allied Health Sciences Department, the University Institute of Physical Therapy, the University of Lahore, Lahore, Pakistan

<sup>3</sup>Nursing Department, Nawaz Sharif Social Security Teaching Hospital, Lahore, Pakistan

## Email address

drtariqrafq149@yahoo.com (M. T. Rafiq), zahoorelahi2662@gmail.com (Z. Elahi)

\*Corresponding author

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## Abstract

**Objectives:** The aims of this study were to investigate the effects of mobilization, exercise, and combining effects of mobilization and exercise on the neck muscles spasm and pain. **Methods:** The study employed an intervention approach to data obtained from 200 randomly selected patients using a pre-defined inclusion and exclusion criteria. Selected patients were randomly divided into three groups. In Group-A patients were treated with mobilization, in Group-B patients were treated with exercise and in Group-C patients were treated with combined therapy of mobilization and exercise. Statistical Package for the Social Sciences (SPSS) 16 was used to manage and analyze the data. **Results:** In Group A, B and C, patient's improvement of mean muscular spasm and pain was  $39.25 \pm 8.58$ ,  $11.34 \pm 3.43$  and  $44.09 \pm 13.35$  respectively. In terms of p-value mean muscular spasm and pain was statistically different in treatment groups and in Group-C patient's improvement of muscular spasm and pain was the greatest. So it can be said that treatment-C is more effective in reducing muscular spasm and pain. i.e. (p-value=0.000). **Conclusion:** Combination therapy (Mobilization + Exercise) is the best treatment option for treating patients with neck pain. Although only mobilization is also effective for patients with neck pain, but this benefit is seen mostly in short term reduction in pain and improved range of motion.

## Keywords

Mobilization, Exercise, Neck Pain, Spasm

## 1. Introduction

Neck pain is defined as pain and/or stiffness felt dorsally in the cervical region somewhere between the C1 and the C7 vertebral prominence. Neck pain and spasm can occur from the center of the neck, sides of the neck, back of the head, down to the shoulders, at the upper thoracic region, and/or at the jaws. Clinically, it is known that even in patients with no indication of nerve root compression, neck pain may be linked with pain referred along myotomal patterns to the arm, anterior chest and dorsal spine regions. The neurological examination of the arm, anterior chest and dorsal spine regions would, of course, be normal [9]. Both in road traffic accidents and in the work place and at home,

chronic neck pain is possibly 2<sup>nd</sup> only to chronic lower back pain related to injury and disability claims. At any specified time, about 10% of the population report having neck pain on at least seven days/month, at least 80% of the population reports neck pain of indefinite duration at some time, and in population based studies incidence of acute neck pain occurs 20-30% yearly. These figures are from different countries, there is limited data that in Asia neck pain may be less common [14], [3], [6], [7], [13].

Exercise therapy is effective for treatment of neck pain is the general sense among rehabilitation specialists [3]. There are numerous types of therapeutic neck exercises, including

range of motion exercises, isometric exercises, dynamic exercise programs, postural training, and general fitness programs. Furthermore, occupational programs and multimodal treatments generally comprise a major treatment part along with other therapies, such as counseling and education. Although the frequency and the enthusiasm with which exercise is suggested and this recommendation is made, have directly describing the question of benefit based on a few randomized control trials [12], [20]. Clinical trial evidence [1], suggests that the neck pain is treated favorably by the exercise, but this is based on a very limited number of studies. However, at least one systematic review has actively approved the role of exercise in the treatment of neck pain. The effects of exercise on secondary prevention of recurring neck pain also need explanation. Findings of one article [5], showed that the main exercises used for non-specific chronic neck pain were cervical strengthening and endurance training exercise. Short-term interventions (10 to 12 weeks) helped to improve the body structure, function, activity and participation immediately after the intervention, but this is not the same for long-term follow-up. On the other hand, long-term exercises (1 year) resulted in improvements in body structure and function at the 3 year follow-up.

Mobilization is defined as low velocity movements within the normal ranges of motion of a joint. These techniques may be active, passive or therapist assistance and may include traction or another intervention designed to reduce pain or resistance to motion. Numerous studies have studied the effect of mobilization procedures on neck pain. A recent, randomized controlled trial has compared manual mobilization therapy with conservative physical therapy, which includes exercise, modalities, and traction, as per indicated or with continual care by a general practitioner for patients with neck pain of at least two weeks' duration. Total duration of treatment was six weeks, and the evaluations of patients were done after the 3<sup>rd</sup> and 7<sup>th</sup> week. Patients who were treated with a mobilization technique were much improved or fully recovered as compared to other treatments. Pain scores were also considerably lower for patients treated with mobilization. Although disability scores improved and were better at all-time points in the mobilized group, this improvement did not reach the level of statistical significance [18], [15], [16], [4]. [11]. Published study [21], compared the effectiveness of Maitland and Mulligan's mobilization and exercises on pain response, range of motion (ROM) and functional ability in patients with mechanical neck pain. It showed that manual therapy interventions were no better than supervised exercises in reducing pain, improving ROM and neck disability.

This study was designed to know the effectiveness of mobilization, exercise and combined effects of these two techniques for treatment of neck muscular spasm and pain. This was also helpful to determine either single model or multi model therapy approach was effective for treatment of neck pain and spasm.

## 2. Material & Methods

This was an Interventional study. Study was conducted at the Social Security Hospitals, Lahore, Pakistan. Study was completed in 6 months after the approval of Synopsis. Factory workers were the main population of interest for the researcher. Total 200 patients were enrolled in the study. Purposive sampling technique was used for sample selection.

### 2.1. Sample Selection Criteria

#### 2.1.1. Inclusion Criteria

Patients were included in this study which had Punjab Employees Social Security cards for treatment, males & females between the ages of 25 to 40 years, patients with neck muscular spasm and pain, and patients with decreased range of motion of neck.

#### 2.1.2. Exclusion Criteria

Patients of age < 25 and age > 40, conditions like osteoarthritis, herniated disc, whiplash injury, cervical spondylosis & parkinsonism were excluded from this study.

### 2.2. Treatment Groups

Selected patients were randomly divided into three groups (Group-A = Mobilization, Group-B = Exercise & Group-C = Mobilization + Exercise), keeping in mind the treatment option used in each group.

### 2.3. Methodology

The researcher used the Maitland's mobilization techniques for relieving the neck pain and spasm. Small amplitude rhythmic oscillations (Grade-1) were performed 20 times at the start and end of each mobilization session. Large amplitude rhythmic oscillations (Grade 2 & 3) were performed 20 times of each session at the facet joints of cervical spine. Postero-anterior (PA) approach was used for the mobilization techniques. Mobilization protocol was used for Groups-A and C. Patients of Groups-B and C performed 15 repetitions of neck flexion, extension, side flexion and rotation actively, at the start of each session. After those 15 repetitions each of isometric neck flexion, extension, side flexion and rotation were performed. Mobilization and/or exercise sessions were performed 3-4 times a week. Treatment sessions continued until the pain and spasm subsided.

### 2.4. Statistical Analysis

Statistical Package for Social Sciences (SPSS) 16 was used to manage and analyze the data. All the quantitative data were presented in the form of mean  $\pm$  SD. Qualitative data were presented in the form of frequency, table, percentages and appropriate graphs if applicable. Chi square test was applied to see the association between qualitative variables. One way analysis of variances (ANOVA) was used to see the pain reduction in all treatment groups. P-value  $\leq$  0.05 was taken as significant.

### 3. Results

**Table 1.** Age of patients with respect to treatment groups.

	Group-A	Group-B	Group-C
N	67	67	66
Mean	33.61	36.41	37.60
Std. Deviation	7.55	10.47	11.70
Range	39	42	42
Minimum	20	23	22
Maximum	59	65	64

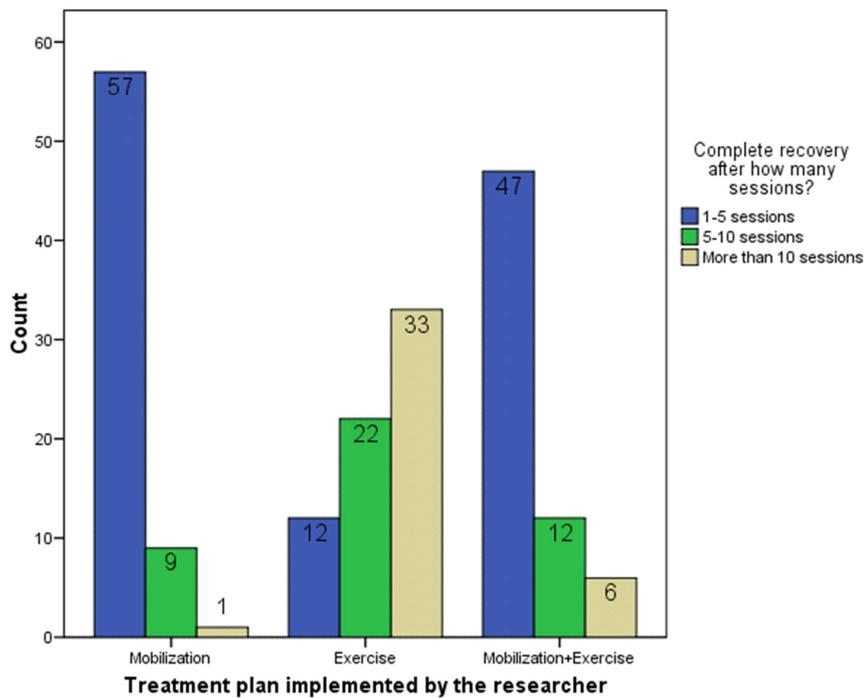
In Group-A there were 39 male and 28 female patients. In Group-B there were 31 male and 36 female patients and in Group-C there were 32 male and 34 female patients. Total 200 patients were enrolled and randomly divided into three groups. Among these 200 patients, 158 were married (Group-A=51, Group-B=57, Group-C=50) and 42 were unmarried (Group-A=16, Group-B=10, Group-C=16).

**Table 2.** Socioeconomic status of patients.

		Socioeconomic status				Total
		Lower	Lower Middle	Middle	Upper	
Treatment	Group-A	48	13	2	4	67
	Group-B	47	11	7	2	67
	Group-C	38	16	10	2	66
Total		133	40	19	8	200

**Table 3.** Severity of neck pain with respect to time.

		At what time is the most severe neck pain			Total
		Morning	Evening	During working	
Treatment	Group-A	20	4	43	67
	Group-B	31	6	30	67
	Group-C	41	4	21	66
Total		92	14	94	200



**Figure 1.** Patients complete recovery with respect to treatment sessions.

According to p-value complete recovery of patients was significantly associated with treatment groups. i.e. (p-value=0.000). Patient's satisfaction was insignificantly associated with treatment groups. Total 197 patients told that they were satisfied with the treatment. (Group-A=67, Group-B=64 & Group-C=66). So it can be said that all three treatments were equally effective regarding patients satisfaction. i.e. (p-value=0.05).

This study concluded that in Group-A, B, & C, improvement of patient's mean muscular spasm and pain was 39.25±8.58, 11.34±3.43 and 44.09±13.35 respectively. In terms of p-value improvement of mean muscular spasm and pain was statistically different in treatment groups and in Group-C patient's muscular spasm and pain were greatly improved as compared to other treatment groups. So it was found that treatment-C was more effective in reducing

muscular spasm and pain. i.e. (p-value=0.000).

#### 4. Discussion

Neck pain is a common illness in developed countries, and constitutes a foremost medical and socioeconomic problem. Neck pain is one of three most usually reported complaints of the musculoskeletal systems (MSS), and there is a variation between point prevalence of 10-22% depending on the definition of neck pain and population [14], [6], [2], [19]. The lifetime prevalence has been projected to be in between 67-71%, representing that about 2/3 of all individuals will experience an episode of neck pain at some time during life [14], [19].

Manual therapy is often used with exercise to treat neck pain. One systematic review [17], concluded that manipulation or mobilization combined with exercise improves pain, function, quality of life and patient satisfaction for adults with neck pain with or without cervicogenic headache or radiculopathy. 29% of 17 randomized control trials had a low risk of bias. Low quality evidence suggested clinically important long-term improvements in pain, function and global perceived effect when manual therapy and exercise were compared to no treatment. Greater short-term pain relief was suggested by higher quality evidence than exercise alone. Research study [8], concludes that specific neck and shoulder exercises are better treatment choices for treating chronic tension-type headache. Besides the consensus that exercise therapy is beneficial in the treatment of chronic pain, the lack of endogenous analgesia in some chronic pain disorders should not be ignored.

The findings of two high quality systematic reviews provided the overview of the recent evidence to the chiropractors to assist them in developing effective treatment protocols for their neck pain patients. Manipulation or mobilization combined with exercise appeared to be most effective, conservative means of managing patients with neck pain and its associated disorders [10].

According to the results of current study it was observed that patients who were treated with exercise, their pain relief level was significantly different from mobilization and/or combination therapy (mobilization + exercise). These results were consistent with most of the studies in the literature mentioned above. In Group-A relief of patient's mean muscular spasm and pain was  $39.25 \pm 8.58$ , in Group-B relief of patient's mean muscular spasm and pain was  $11.34 \pm 3.43$  and in Group-C relief of patient's mean muscular spasm and pain was  $44.09 \pm 13.35$  respectively. In terms of p-value improvement of mean muscular spasm and pain was statistically different in treatment groups and in Group-C patient's muscular spasm and pain was greatly relieved as compared to other treatment groups. The researcher observed that treatment-C was more effective in reducing muscular spasm and pain. i.e. (p-value=0.000).

This study is not without limitation that are worth mentioning. Firstly data were collected only at social security

hospitals and by one physical therapist only. Secondly, no formal measurements were taken to document the patient's improved range of motion. Thirdly it was difficult to determine dosage parameters throughout the patient's care. Further research is necessary for the validity of the findings at other different hospitals and to establish the dosage parameters for the patients.

#### 5. Conclusion

In current study researcher observed that the combined therapy, mobilization + exercise, was the best treatment option for treating patients with neck pain and spasm. Although mobilization was better for treating patients with neck pain and spasm, but it was more effective than exercise. So it was concluded that combined therapy, mobilization + exercise, was the best treatment option for treating patients with neck pain and spasm.

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