ORIGINAL ARTICLE

# Efficacy of Cervical Spine Mobilization Versus Peripheral Nerve Slider Techniques (Neurodynamics) in Cervicobrachial Pain Syndrome

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**ABSTRACT**

**Objective:** The objective of this study was to compare the efficacy of cervical spine mobilization versus peripheral nerve slider techniques (neurodynamics) incervicobrachial pain syndrome.

**Study Design:** The study design was arandomized interventional study.

**Place and Duration of Study:** This study was conducted at the Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi from August 2014 to January 2015.

**Materials and Methods:** Forty patients (n=40) were included by using purposive sampling technique. Patients of Age 30 to 60 years with Radiating neck pain, Limited ROM of neck and Pain persisting for more than 2 months, were included in study. Then randomly divided into two groups, each group contains 20 participants. One group was treated with neck mobilization and other was treated with neurodynamic treatment protocol. Pain and Active Range of Motion (AROM) was measured by Visual analog scale (VAS) and Inclinometer respectively. Neck Disability Index was also used. Patients were assessed before and after six week intervention. Data was analyzed on SPSS 20 and Independent t Test was used to compare the results of two groups.

**Results:** Pain was measured on VAS, the mean of Mobilization and Neurodynamics were (2.0+1.892 vs. 4.8+2.397) respectively. There is significant ($p<0.05$) difference between two groups. There is also significant ($p<0.05$)difference for Range of Motion between two groups. The mean value for NDI of both groups were (14.5+7.564 vs 26.80+11.484). It also shows better treatment is mobilization.

**Conclusion:** The results of this comparison between two single interventions indicate that cervical mobilization treatment in neck pain is more useful than anneurodynamic treatment. For daily practice, we can recommend treatment according to the expert guidelines investigated.

**Key Words:** *Neurodynamic, Neck Mobilization, NDI, VAS.*

## Introduction

Neck pain is the major health complains in our society and also worldwide. When there is a combination of neck pain and complaint in the arm, we can call it a cervicobrachial syndrome or cervicobrachialgia. It refers to a cervical syndrome with pain radiating into the upper limb. Cervicobrachial syndrome was, therefore, previously known as “lower cervical syndrome”. Life time prevelance of cervicobrachialgia is 71%.[1]

Cervicobrachialgiais one of those condition which has huge financial and disabling impact on population.[1] In cervicobrachialgia the cervical canal may be narrowed by osteophyticlipping of the facet or uncovertebral joints, by central disc herniations, by thickening of the ligamentumflavem, or even from local cervical vertebral subluxations associated with ligamentous laxity.[2]

Vertebral artery involvement by osteophytic outgrowths or local spinal instability may cause drop attacks precipitated by extension of the neck. Osteophytes arising from the anterior vertebral margins may sometimes, because of their size, give rise to dysphagia[3] Neck pain is a common disorder in our population, and combined with low back pain. A number of studies show moderate to good evidence that manual therapy may all eviate neck pain. This an algesicef fect may not only bee xplained by traditional approaches such as the Gate Control. The oryand reduce peripheral afferent discharge but also by the activation of central nervous pain mechanisms such as the peri aqueductal gray, which seems to be responsible for modulation of auto

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*Received: September 19, 2015; Accepted: November 17, 2015*

nomic functions and pain control. There was greater improvement in function and pain with manual therapy (manipulation/mobilization) directly on the cervical spine and indirectly on the shoulder and dorsal spine than without treatment.[4]

Neuromobilization maneuver has recently been used to treat nerve entrapment syndromes. It consists of a series of therapeutic active and passive movements aimed at restoring the normal mechanical properties of the nerve in common postures and during extremity movements. Neuromobilization maneuvers help to restore longitudinal motion of the affected nerve. Any pathology that reduces the nerve motion and normalstrain may produce an abnormal tension in the corresponding nerve in common postures and during extremity movements.[5]

As nerve mobilization only improve the mobility of nerve within different interfaces.[4] If the compression will be on these interfaces then it will be relive by neurodynamics. On the other hand cervical mobilization also decreases pressure on nerve roots. Individually these therapeutics techniques are effective for cervicobrachialgia but with certain limitations. So the objective of this study was to compare the effects of neudynamics and cervical mobilization on cervicobrachial pain.

## Materials and Methods

The study design was randomized interventional study, conducted at the AFIRM Rawalpindi, from August 2014 to January 2015. The study protocol was duly approved from ethical committees of AFIRM. Total sample size was 40 patients. Patients of Age 30 to 60 years with Radiating neck pain, Limited ROM of neck and Pain persisting for more than 2 months, were included in study. But Patients with spinal stenosis, Disc bulge, Spinal surgery, Carcinoma and Neuromuscular Pathology were excluded from study. We divided patients in both groups by lottery draw method. In mobilization group treatment was given by fallowing the Maitland Treatment Guidelines and control group was treated with standard protocol of neurodynamics.

Data collection variables were structured Questionnaire, VAS, Range of Motion (ROM), NDI, and Neck Bournemouth Questionnaire. This was quantitative, parametric data. It was entered on SPSS 20 software and Independent t Test was applied to compare the results of two groups.

## Results

All participants (n=40) of this study were divided into Mobilization (n=20) and Neurodynamic groups (n=20). The mean age of Mobilization group was 52.60+6.159 and Neurodynamic group was 42.70 + 9.953. There is significant difference ($p<0.05$) for neck disability index between mobilization (14.50+ 7.564) and neurodynamics (26.80 + 11.484) group (Fig 1). Mean + SD of all neck ranges (degrees) Flexion, extension, side bending to painful and non painful side, rotations of both sides of Neck in both Group was measured (Table I). There is significant difference ($p<0.05$) between both group. There is also significant difference ($p<0.05$) for visual Analogue Scale between mobilization (2.0+ 1.892) and neurodynamics (4.8 + 2.397) group (TableII).

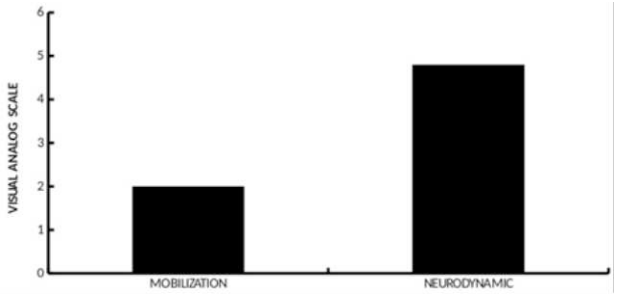


**Fig 1: Mean of Visual Analogue Scale in Mobilization and Neurodynamic Group. There is significant difference ($p<0.05$) between both groups**

**Table I: Mean and Standard Deviation of Flexion, Extension, Side Bending Painful side, Side Bending Non-Painful side, Rotation Painful side, Rotation Non-Painful side**

| Variables | Mobilization Mean ± SD | Nuerodynamics Mean ± SD | P-Value |
|---|---|---|---|
| Flexion of neck | 71.50±4.323 | 63.00±7.504 | 0.000*** |
| Extension of neck | 43.75±2.221 | 39.75±4.128 | 0.000*** |
| Side bending pain full side | 39.25±2.447 | 34.50±4.261 | 0.000*** |
| Side bending non pain full side | 38.25±4.375 | 35.0±4.292 | 0.023* |
| Rotation pain full side | 37.00±6.959 | 36.0±6.407 | 0.639 |
| Rotation non pain full side | 33.25±7.482 | 32.75±6.382 | 0.821 |
| Visual analog scale | 2.0±1.892 | 4.8±2.397 | 0.000*** |
| Neck disability index (NDI) | 14.50±7.564 | 26.80±11.484 | 0.000*** |

**Table II: Mean and Standard Deviation of Visual Analog Scale (VAS), NDI, Rate Neck Pain, Neck Pain Interfared activity (ADL), Neck Pain Interfered Social Activity, Neck Pain & Anxiousness, Neck Pain & Depression, Neck Pain Affected on Job, Self Control on Neck Pain**

| Variables | Mobilization Mean ± SD | Nuerodynamics Mean ± SD | P-Value |
|---|---|---|---|
| Visual analog scale | 2.0±1.892 | 4.8±2.397 | 0.000*** |
| Neck disability index (NDI) | 14.50±7.564 | 26.80±11.484 | 0.000*** |
| Rate neck pain | 1.55±1.504 | 4.70±2.364 | 0.000*** |
| Neck pain interfered your activity | 1.65±1.872 | 4.10±2.882 | 0.003** |
| Neck pain interfered your social activity | 1.70±1.658 | 4.40±2.664 | 0.000*** |
| How anxious your feeing | 1.65±1.599 | 4.05±2.523 | 0.001** |
| How depressed | 1.50±1.573 | 4.30±2.577 | 0.000** |
| How your work affected | 1.40±1.729 | 3.90±2.808 | 0.002** |
| How much able to control your neck pain | 1.10±1.518 | 3.75±2.468 | 0.000*** |

## Discussion

The results revealed significant pain reduction in the neck pain for the patients who received cervical mobilization. Over the investigation period, these patients showed a decreases in neck pain on the Visual Analogue Scale which can be regarded as a clinically relevant change.[7]

To date, the only known study to compare articular with neurodynamic treatment was conducted by Allison et al.[8] Thirty patients with cervicobrachial pain were randomly assigned to one of three groups: neural treatment, articular treatment, and control group. Neural treatment involved mobilization techniques for neural and adjacent tissues, such as cervical lateral glide, shoulder girdle oscillation and muscle re-education. The articular treatment consisted of indirect approaches such as glenohumeral mobilization and thoracic mobilization. No treatment was performed in the third group. Pain was assessed at baseline and after four and eight weeks. The result showed significant pain reduction in both group. Furthermore the between group comparison revealed a significant difference after eight weeks with the patients in the neural treatment groups reporting lower pain on the VAS than those receiving the articular treatment. The authors concluded that both interventions could significantly reduce pain with a potential advantage for the specific neural treatment but mentioned that the articular treatment is a generalized treatment not addressed to actual joint dysfunction. Therefore the effects of the articular treatment approach can be regarded as indirectly supporting the hypothesis that less direct techniques could also affect neural structures. Although comparing a neural with an articular treatment approach, these findings may not be compared to the results in the present study. While Allison et al[8] performed neurodynamic techniques in combination with articular mobilization techniques, for example the cervical lateral glide, which is thought to influence the neural as well as the articular tissues[9], within one group, these techniques were explicitly separated in the present study.

The analgesic effect of cervical mobilization techniques is supported by other investigations.[10,11,12,13] Schmid et al[12] and Bialsky et al[14] suggested that supraspinal centers are likely to be important in pain modulation. Furthermore, they hypothesized that the periaqueductal grey (PAG) in the midbrain may be involved. An analgesic effect through the likely activation of this supraspinal center may explain the pain reduction in regions not directly addressed by the treatment. In the present study this effect can be seen in the patients who received neurodynamic treatment and experienced decreased neck pain. In the patients who received cervical mobilization, the analgesic effects in the neck and arm may either be explained by the above mentioned supraspinal centers or by an improved functioning of the mechanical interfaces.

Due to the mobilization, the facet joints are supposed to have a better opening and closing function, thereby reducing compression on neural tissues. This reduced compression might contribute to improve physiological and mechanical conditions in the neural tissues, leading to analgesic effects in the upper extremity.[15]

Regarding cervical range of motion, the patients in experimental group gradually improved more than the patients in control group. A possible reason for this might be that the patients in experimental group received mobilization techniques directly applied at the cervical spine. These techniques are not only effective for pain reduction but also for increasing range of motion[15], where as the primary objective

of neurodynamic techniques is not an increase in cervical range of motion but pain reduction as well as an increase in neural mobility.[14,15]

For these reasons, a greater improvement in the cervical range of motion through the mobilization treatment was expected. Although to a lesser extent, the neurodynamic treatment also led to increases in cervical range of motion. This may be explained by the improved gliding and sliding of neural tissues leading to reduced interference of the cervical motions.[15]

## Conclusion

The results of this comparison between two single interventions indicate that cervical mobilization treatment in neck pain is more useful than neurodynamic treatment. For daily practice, we can recommend treatment according to the expert guidelines investigated. However, further research is needed to provide stronger scientific evidence. There is greater improvement in function and pain with manual therapy (mobilization) directly on the cervical spine and indirectly on the shoulder and dorsal spine than without treatment.

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