

EFFECTS OF NEURAL MOBILISATION ON NECK DISABILITY IN CERVICAL RADICULOPATHY

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ABSTRACT

Background & Purpose: Cervical radiculopathy results in neck pain, however the primary symptoms are upper extremity pain, numbness and weakness which often results in significant functional limitations and disability. Neural mobilization is set of techniques designed to restore plasticity of the nervous system. The purpose of this study is to examine effect of neural mobilization along with other conservative treatment in management neck functional disability in cervical radiculopathy patients.

Participants: 30 patients with cervical radiculopathy within age group of 30-60 years, both male and female, who fulfilled inclusion and exclusion criteria were divided into group A (experimental) and group B (control), 15 in each group.

Methodology: Group A received neural mobilization with conventional physiotherapy treatment including Interferential current therapy(IFT), intermittent cervical traction(CT) and isometric neck exercises while group B received IFT, CT and isometric neck exercises for 10 sessions. The outcome measure neck disability index (NDI) was measured before starting the study and at the end of 10 sessions.

Analysis: The signed rank test and Mann Whitney U test were used for intra-group and intergroup statistical analysis respectively.

Results: Both groups showed significant improvement ($p<0.01$) in NDI. Group A showed greater improvement.

Conclusion: Neural mobilization with conventional therapy is effective in treatment of cervical radiculopathy in terms of decreasing neck functional disability.

KEYWORDS: cervical radiculopathy, neural mobilization, neck disability

INTRODUCTION

Cervical radiculopathy (CR) is frequently encountered in physical therapy with an annual incidence of 83·2 per 100 000 people and there is an increased prevalence in the fifth decade of life^{1,2}.

Cervical radiculopathy is the result of cervical nerve root pathology often caused by space occupying lesions such as cervical disc herniation, spondylosis, or osteophytosis. These space occupying lesions affect the pain generators of bony and ligamentous tissues within the cervical spine, producing upper extremity radicular symptoms (i.e. pain, numbness, weakness, paresthesia)^{3,4}.

Location and pattern of symptoms will depend upon nerve root level affected⁵. The seventh and sixth cervical nerve roots are most commonly affected¹.

People with neck pain combined with upper extremity symptoms experience greater levels of disability than do people with neck pain alone⁶.

Treatment strategies for patients with cervical radiculopathy range from conservative management to surgery. Evidence suggests that patients who are treated conservatively may experience superior outcomes compared to those who undergo surgery⁷. However, there is little evidence to suggest which non-operative interventions are the most effective⁸.

Neural mobilization is a set of techniques designed to restore plasticity of the nervous system, defined as the ability of nerve surrounding structures to shift in relation to other such structures.

It contributes to restoring the ability of neural tissue itself to stretch and tension and stimulates the reconstruction of normal physiological function of nerve cells⁹.

Very few studies have seen the effect of nerve mobilization in cervical radiculopathy.

The purpose of this study is to assess effects of neural mobilization along with other conservative treatment in management functional disability of neck in cervical radiculopathy individuals.

AIMS AND OBJECTIVES

AIM

To study the effectiveness of neural mobilization along with conventional therapy on functional disability of neck in management of cervical radiculopathy.

OBJECTIVES

To find out effect of neural mobilization on functional disability of neck in management of cervical radiculopathy.

To find out effect of conventional physiotherapy treatment on functional disability of neck in management of cervical radiculopathy.

To find out additive effect of neural mobilization with conventional therapy on functional disability of neck in management of cervical radiculopathy.

HYPOTHESIS

Null hypothesis

There will be no significant difference between effect of neural mobilization along with conventional therapy and conventional therapy on neck disability in management of cervical radiculopathy.

Experimental hypothesis

There will be significant difference between effect of neural mobilization along with conventional therapy and conventional therapy on neck disability in management of cervical radiculopathy.

METHODOLOGY

MATERIALS

- Consent Form
- Assessment Form
- Weighing machine
- IFT machine
- ICT machine
- Treatment table

STUDY DESIGN: Quasi experimental study

STUDY SETTING: All the patients were taken from general hospital, Ahmedabad.

SAMPLE DESIGN: Convenience sampling

SAMPLE SIZE: 30 patients of cervical radiculopathy, divided between control and experimental group

INCLUSION CRITERIA

- Age: 30 – 60 years
- Sex: male and female
- Neck pain radiating to any one upper limb since more than 3 weeks
- Positive ULTT 1 with structural differentiation positive for neural involvement
- Willing to participate in the study

EXCLUSION CRITERIA

- History of sudden onset
- Prolapsed intervertebral disc(grade III & IV)
- Cervical instability
- Severe osteoporosis
- Spinal conditions like myelopathy/tumors/infection
- Traumatic injuries of upper limb and cervical spine
- Under treatment of steroid injections/Spinal surgeries

PROCEDURE

Suitable subjects taken who fulfilled inclusion and exclusion criteria after complete assessment

Filling up of the consent form and randomly allocated to control and experimental group

CLINICAL INTERVENTIONS

Group A: neural mobilization^{10,11} and conventional therapy (ICT, IFT and isometric neck exercises)¹²⁻¹⁴

Group B: conventional therapy alone

Protocol was given for 10 days with one session per day (6 days/week)

NEURAL MOBILIZATION

Patient was placed in supine lying position on the plinth and ULTT1 position was given with Scapular depression, Shoulder abduction, Forearm supination, wrist and finger extension, Shoulder lateral rotation, Elbow extension, Contralateral cervical side bending. Neural mobilization was done using wrist component.

Initially, two series of oscillations procedures of a few seconds duration were performed at a frequency of 2-4 oscillations per second. As the patient's condition improved, the duration of the procedure was extended to 20-30 seconds, with increase in the amplitude and more series of oscillations.

CONVENTIONAL THERAPY

Intermittent cervical Traction was applied to the patient in supine position with neck flexed (traction force 1/10th of patient's body weight) for 15 minutes.

IFT (carrier frequency 4 KHz; beat frequency 100 Hz, gradually sweep was introduced) was given by quadripolar method with intensity as per patient's tolerance for 15 minutes.

Isometric neck exercises were given for flexion, extension, side flexion and rotation with manual resistance. (10 repetitions were performed with 6 second hold). The intensity of the isometric exercises can be from light to strong, depending on the patient's symptoms and tolerance.

OUTCOME MEASURE

Recording of NDI on the 1st and the 10th day (last day) of the treatment¹⁵.

The Neck Disability Index (NDI) is a self-report questionnaire used to determine how neck pain affects a patient's daily life. NDI consists of ten questions. Each of the 10 sections is scored separately (0 to 5 points each) and then

added up. The score is often reported as a percentage (0-100%)

RESULTS

Data analysis was done using SPSS software version 16.

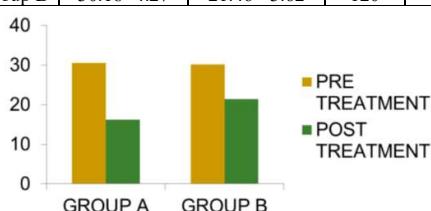
Baseline measures between the groups were similar.

P value for NDI: 0.736(>0.05)

For within group analysis, non-parametric Wilcoxon Signed Rank Test was applied for NDI score of group A and B which showed significant difference ($T: 120$, $p<0.01$) indicating improvement in both the groups.

TABLE 1: COMPARISON OF MEAN VALUES OF NDI, PRE TREATMENT AND POST TREATMENT IN BOTH GROUP A AND GROUP B

Group	Pre treatment	Post treatment	T value	p value
	Mean + SD	Mean + SD		
Group A	30.48+5.26	16.24+4.80	120	< 0.01
Group B	30.18+4.27	21.46+3.62	120	



GRAPH 1: WITHIN GROUP ANALYSIS OF NDI SCORE

Between the groups, non-parametric Mann Whitney U test (Wilcoxon Sum Rank Test) was used and there was also significant difference of NDI score between group A and B ($z -2.63$, $p <0.0001$)

TABLE 2: COMPARISON OF POST TREATMENT MEAN VALUES OF NDI BETWEEN GROUP A AND GROUP B

Scale	Z value	p value
NDI	-2.63	0.008

DISCUSSION

Results of the present study shows that neural mobilization using upper limb tension test along with other conventional therapy is effective in treatment of cervical radiculopathy in terms of decreasing neck functional disability. Improvement in other group receiving conventional therapy was also seen but improvement in NDI was more in neural mobilization group.

This results are in accordance with work done by Donald murphy et al, 2006. They have studied clinical outcomes of patients with

cervical radiculopathy treated nonsurgically. Twenty-four of 31 (77.4%) patients had a clinically significant improvement from baseline to the end of treatment, and 25 of 27 (92.6%) had a clinically significant improvement from baseline to long-term follow-up. Bournemouth Disability Questionnaire and NPRS were outcome measure.⁸

The reason for improvement in both the groups might have been the effect of ICT, IFT and exercises which were used in both the groups.

Traction unloads the component of spine¹⁶. IFT close the pain gate mechanisms and thereby reduces the pain perception¹⁴. Isometric exercise improving strength, endurance and tone of the neck muscles.

Better improvement in experimental group might be effect of neural mobilization which was additionally given. Neural mobilization gives positive impact on symptoms by improving intraneural circulation, improving axoplasmic flow, improving neural connective tissue viscoelasticity and reducing the sensitivity of AIGS (Abnormal impulse generating sites)¹⁷.

Neural mobilization with other conservative treatment showing improvement is also in accordance with work done by Murphy et al. for lumbar canal stenosis with lumbar distraction and neural mobilization¹⁸.

LIMITATIONS

- Absence of randomization
- Small sample size
- No long term follow up
- Subjective outcome measure
- Neural mobilization for other nerves of upper limb not included.

FUTURE RECOMMENDATION

Further studies can be done with random sampling; large sample size and long term follow up.

Other studies using different nerves of upper limb with objective outcome measures can be done.

CONCLUSION

Neural mobilization along with other conventional therapy is effective for decreasing neck functional disability in management of cervical radiculopathy.

CONFFLICT OF INTEREST

None

REFERENCES:

1. Radhakrishnan K, Litchy WJ, O'Fallon WM, Kurland LT. Epidemiology of cervical radiculopathy. *Brain*. 1994 Apr 1;117(2):325-35.
2. Wainner RS, Gill H. Diagnosis and nonoperative management of cervical radiculopathy. *Journal of Orthopaedic & Sports Physical Therapy*. 2000 Dec;30(12):728-44.
3. Cleland JA, Whitman JM, Fritz JM, Palmer JA. Manual physical therapy, cervical traction, and strengthening exercises in patients with cervical radiculopathy: a case series. *Journal of Orthopaedic & Sports Physical Therapy*. 2005 Dec;35(12):802-11.
4. Waldrop MA. Diagnosis and treatment of cervical radiculopathy using a clinical prediction rule and a multimodal intervention approach: a case series. *Journal of Orthopaedic & Sports Physical Therapy*. 2006 Mar;36(3):152-9.
5. Benini A. Clinical features of cervical root compression C5-C8 and their variations. *Neuro-orthopedics*. 1987;4(2):74-88.
6. Daffner SD, Hilibrand AS, Hanscom BS, Brislin BT, Vaccaro AR, Albert TJ. Impact of neck and arm pain on overall health status. *Spine*. 2003 Sep 1;28(17):2030-5.
7. Sampath P, Bendebba M, Davis JD, Duckett T. Outcome in patients with cervical radiculopathy: prospective, multicenter study with independent clinical review. *Spine*. 1999 Mar 15;24(6):591-7.
8. Murphy DR, Hurwitz EL, Gregory A, Clary R. A nonsurgical approach to the management of patients with cervical radiculopathy: a prospective observational cohort study. *Journal of manipulative and physiological therapeutics*. 2006 May 31;29(4):279-87.
9. Butler, DS. Mobilisation of the nervous system. Melbourne, Australia: Churchill Livingstone.1991
10. Butler DS. Adverse mechanical tension in the nervous system: a model for assessment and treatment. *Australian Journal of Physiotherapy*. 1989 Dec 31;35(4):227-38.
11. Dwornik M, Bialoszewski D, Korabiewska I, Wroński Z. Principles of neuro mobilization for treating musculoskeletal disease. *Ortopedia, traumatologia, rehabilitacja*. 2006 Dec;9(2):111-21.
12. Young IA, Michener LA, Cleland JA, Aguilera AJ, Snyder AR. Manual therapy, exercise, and traction for patients with cervical radiculopathy: a randomized clinical trial. *Physical therapy*. 2009 Jul 1;89(7):632-42.
13. Nelson and Currier. *Interferential Current* 9:183-207
14. Dusunceli Y, Ozturk C, Atamaz F, Hepguler S, Durmaz B. Efficacy of neck stabilization exercises for neck pain: a randomized controlled study. *Journal of rehabilitation medicine*. 2009 Jul 5;41(8):626-31.
15. Cleland JA, Fritz JM, Whitman JM, Palmer JA. The reliability and construct validity of the Neck Disability Index and patient specific functional scale in patients with cervical radiculopathy. *Spine*. 2006 Mar 1;31(5):598-602.
16. Reddy RS, Eapen C, Senthil Kumar P. Efficacy of Intermittent Cervical Traction in the Treatment of Cervical Radiculopathy a Randomized Controlled Study. *Physiotherapy-The Journal of Indian Association of Physiotherapists*. 2008;5-9.
17. Nee RJ, Butler D. Management of peripheral neuropathic pain: integrating neurobiology, neurodynamics, and clinical evidence. *Physical Therapy in Sport*. 2006 Feb 28;7(1):36-49.
18. Murphy DR, Hurwitz EL, Gregory AA, Clary R. A non-surgical approach to the management of lumbar spinal stenosis: a prospective observational cohort study. *BMC Musculoskeletal Disorders*. 2006 Feb 23;7(1):1.