

# EFFECTIVENESS OF CERVICAL MANUAL MOBILIZATION TECHNIQUES VERSUS STRETCHING EXERCISES FOR PAIN RELIEF IN THE MANAGEMENT OF NECK PAIN

Waheed Nida<sup>1</sup>, Amir Muhammad<sup>2</sup>, Noureen Rabia<sup>3</sup>, Nawaz Sumaira<sup>4</sup>, Zaidi Syeda Wajeeha Raza<sup>5</sup>

Editor: Mihail HOTETEU, Romanian Association of Balneology, [hoteteu@yahoo.com](mailto:hoteteu@yahoo.com)

Reviewers: Constantin Munteanu and Gabriela Dogaru



Balneo and PRM Research Journal

DOI: <http://dx.doi.org/10.12680/balneo.2021.446>

Vol.12, No.3 September 2021

p: 261–264

\*Corresponding author: Zaidi Syeda Wajeeha Raza, E-mail: [wajeeha\\_zaidi@hotmail.com](mailto:wajeeha_zaidi@hotmail.com);

1. “College of physiotherapy, Jinnah Post Graduate Medical Center”, Karachi, Pakistan
2. “College of physiotherapy, Jinnah Post Graduate Medical Center”, Karachi, Pakistan
3. “College of physiotherapy, Jinnah Post Graduate Medical Center”, Karachi, Pakistan
4. “College of physiotherapy, Jinnah Post Graduate Medical Center”, Karachi, Pakistan
5. “Indus University, Department of Physical Therapy and Rehabilitation Sciences”, Karachi, Pakistan

## Abstract

**Introduction.** A huge literature is available regarding the efficacy of various physiotherapy techniques for neck pain (NP), however, comparative study is still in scarcity. Therefore, this study aimed to compare effectiveness of stretching exercises versus manual mobilization techniques in the management of NP.

**Material and method.** A randomized controlled trial parallel-group design study was conducted on the patients suffering from NP. Participants with the history of NP, aged between 19 to 60 years, NP without radiculopathy, and no history of trauma were included in the study. Two outcome measures were used i.e., Numeric pain rating scale (NPRS) and neck pain disability index (NDI) questionnaire. Two groups were equally divided had twenty-five patients each. Group A received cervical stretching with strengthening exercises as home-treatment program and group B received manual mobilization with strengthening exercises as home-treatment program. Six sessions were given on alternate basis and assessed pre- and post-treatment information of all patients.

**Results and discussions.** Independent sample t-test was run to compare the post difference between stretching exercises and manual mobilization at 95% confidence interval ( $p < 0.05$ ). The Post NPRS difference between the groups shows no significant improvement ( $p = 0.32$ ). Similarly no significant difference was found in post NDI Disability ( $p = 0.57$ ). Therefore, both the treatment strategies are equally effective in improving NP and disability.

**Conclusions.** This clinical trial concluded that stretching or manual mobilization is equally effective to reduce pain and disability. Hence, improve the quality of life in neck pain survivors.

**Keywords:** *Manual Mobilization Technique, Neck Pain, , Neck Pain Disability Index Questionnaire, Numeric Pain Rating Scale, Range of Motion, Stretching Exercises,*

## I. INTRODUCTION

Neck pain (NP), major global health issue, have considerable socioeconomical impacts on individuals and society as a whole with prevalence between 30-60% in Korean study, with NP being the fourth major cause of disability (1). NP has incidence rate of 15% to 20% and 1.5% to 1.8% of adults receiving medical care for this pain every year (2). In one study Helicopter pilots and crew seem to have higher incidence of neck, shoulder and low back pain (3). On the other hand, evidence showed that the bankers experience frequent shoulder and NP (4). The majority of NP is due to nonspecific or mechanical pathology which results in productivity loss, loss of work hours, and health care costs (5). Untreated Chronic nonspecific NP results in reduced cervical movement and anxiety, depression, disability and reduced quality of life (6). The patients that have cervical pain had high *action* of the axioscapular muscles and diminished action of the lower trapezius and serratus anterior have been reported (7). Poor psychological health, genetics and exposure to tobacco have been previously identified as risk factors for NP (8). Research showed that ergonomically

inappropriate work station, heavy back pack, sedentary lifestyle with exhausting activities, all increase NP and subsequent cervical muscle spasm and weakness (9). Therefore, neuropathic pain results from injury to peripheral nervous system, by mechanical, metabolic or chemical agents. Central pain refers to debilitating intractable pain arising from lesions causing damage to somatosensory pathways of central nervous system (10). Investigations highlighted that the 12-month prevalence of NP is 30–50%, with activity-limiting neck pain varying between 1.7% and 11.5% along with 21% of patients referred to physiotherapy in primary care have NP in Denmark (11). Another research conducted in 2016 found that using percutaneous electrical nerve stimulation following dry needling is more beneficial than using dry needling alone in reducing short-term pain and improving intensity in individuals with myofascial chronic NP (12). Moreover, exercise therapy treatment was widely used treatment for NP (13), however, Tunwattanapong P et al. studied that Stretching and range of motion (ROM) exercises are beneficial for decreasing NP (14).

## METHODOLOGY:

A Randomized control trial (RCT) parallel-group design study was conducted on the patients suffering from NP in the Department of Physiotherapy, Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan. After the approval of synopsis, the study was completed in the duration from January to June 2021. Participants having history of NP, aged between 19 to 60 years, cognitively stable, NP without radiculopathy, no history of trauma were included in the study. Exclusion criteria of the study was the patients who have consistent infections related to spine, osteoporosis, fracture of spine, pregnancy, neoplasm, history of surgery related to spine, positive sign and symptoms of nerve pain and any sign and symptoms of upper motor neuron or any sign and symptoms that are increased with straight leg raise (SLR) test of <45°. Two outcome measures were used. One is Numeric Pain Rating Scale (NPRS) and other one is Neck Pain Disability Index (NDI) questionnaire. The NPRS is a subjective measure in which individuals rate their pain on an eleven-point numerical scale. The scale is composed of

0= no pain

1-3= mild pain

4-6 = moderate pain

7-10 = severe pain

The NDI was developed in 1989 by Howard Vernon. The NDI has become a standard instrument for measuring self-rated disability due to NP and is used by clinicians and researchers alike. Each of the 10 items is scored from 0 - 5. The maximum score is therefore 50. NDI is a self-administered questionnaire that consists of questions for functional activities. This questionnaire has been designed to give information as to how your NP has affected your ability to manage in everyday life. Functional activities are assessed with ten questions designed to measure the degree of difficulty an individual has with various activities of daily living that require neck use.

The sample size of 50 participants was calculated by using WHO online software OPEN EPI version 3. NDI questionnaire was used for evaluating the disability or dysfunction of NP. This is an accurate and sufficient questionnaire meant for assessing the NP patients. As mentioned, NDI highlights 10 elements scored starts from 0 to 5. The aggregate score of every one of the 10 factors is multiplied and spoken to as a rate from 0–100, with a higher absolute score showing more prominent incapacity and disability.

First Group received treatment that is stretching exercises given by physiotherapist. A stool was used for subject proper positioning while the therapist applied cervical stretch in all range flexion, extension, lateral flexion and rotation. Ten repetitions of 10 seconds hold. Patients that lie in the first group were given a home management plan

of strengthening exercises. These treatment intervention exercises were given with overpressure from their hands in all ranges. Every exercise stretch was done with the ten second hold. Treatment was given twice weekly for 3 weeks and total treatment session were six for both groups.

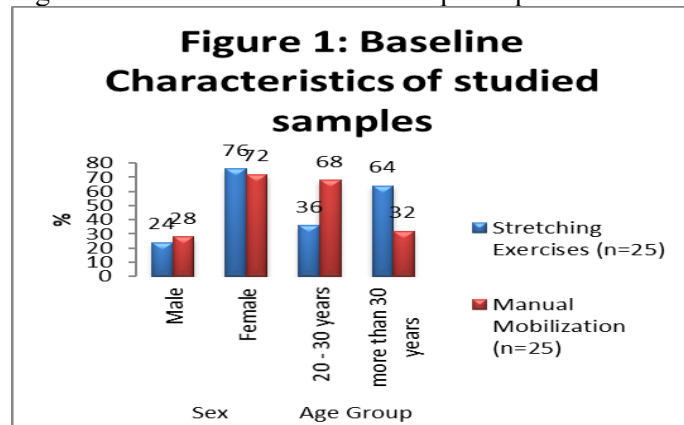
Group 2: Grade I and grade II mobilization with strengthening exercises. Every patient was given treatment intervention that is approximately 10 minutes for mobilization to the hypo mobile segments that is assessed by the examination before the treatment regime. Mobilization was given in prone position. Posterior–anterior mobilization was given to the vertebral segments that were most provocative of 30-second oscillations for three bouts. The subjects performed strengthening exercises as a home treatment program.

Data were investigated by using IBM SPSS version 23.0. Counts with percentages were reported for baseline characteristic of studied variables between two treatment groups Stretching Exercise and Manual Mobilization. Mean and standard deviation reported for NPRS, NDI disability score and NDI scores. For the comparison of the effects of treatment, we used the Paired sample t-test in both studied groups. We also used the independent sample t-test for the comparison of the post treatment outcomes of Stretching Exercise and Manual Mobilization. The considered significant P-value is less than 0.05.

## RESULT:

In the present study there were fifty samples divided equally into two treatment groups stretching exercise and manual mobilization. In stretching exercise there were 76% females, 64% having age group more than 30-years old, and the mean age was  $33.48 \pm 8.59$ , whereas in manual mobilization treatment group 72% were females and 68% having age group between 20-30 years. The mean age was  $30.44 \pm 7.89$  years. The baseline characteristics of participants are shown in figure 1.

Figure 1: Baseline characteristics of participants



Paired sample t-test was run to compare the pre post difference between NPRS score (pre score= mean= 6.92, post score= mean=2.52) and NDI Disability score (pre score= mean=32.08, post score= mean=7.83) in

**stretching exercise group, p value of <0.01 (CI=95%)** shows significant improvement in both the outcome measures. (See Table 1)

Table 1: Mean comparison of NPRS and NDI Disability score in stretching exercises

Score	Pre		Post		p-value
	Mean	SD	Mean	SD	
<b>NPRS</b>	6.92	0.90	2.52	1.78	<0.01*
<b>NDI Disability</b>	32.08	8.24	7.83	3.90	<0.01*

\*p<0.05 was considered significant using paired sample t-test

Paired sample t-test was run to compare the pre post difference between **NPRS score (pre score= mean= 7.36, post score= mean=2) and NDI Disability score (pre score= mean=11.92, post score= mean=8.4) in manual mobilization group, p value of <0.01 (CI=95%) shows significant improvement in NPRS whereas p value of 0.19 showed insignificant improvement in NDI Disability in pre post score.** (See Table 2)

Table 2: Mean Comparison of NPRS score and NDI Disability in Manual Mobilization

Score	Pre		Post		p-value
	Mean	SD	Mean	SD	
<b>NPRS</b>	7.36	1.18	2.0	1.8	<0.01*
<b>NDI Disability</b>	11.92	10.5	8.4	6.6	0.19

\*p<0.05 was considered significant for NPRS score using Paired sample t-test

Independent sample t-test was run to compare the post difference between stretching exercises and manual mobilization at 95% confidence interval (p<0.05). The post NPRS difference between the groups shows no significant improvement (p=0.32). Similarly no significant difference was found in post NDI Disability (p=0.57). (See Table 3)

Hence shows both the treatment strategies are equally effective in improving neck pain and disability.

Table 3: Mean Comparison of Post NPRS and NDI Disability scores between both groups

Score	Stretching Exercises		Manual mobilization		p-value
	Mean	SD	Mean	SD	
<b>Post NPRS</b>	2.52	1.78	2.0	1.8	0.32
<b>Post NDI Disability</b>	9.70	6.37	8.61	6.4	0.57

p-value obtained using Independent Sample t-test

## DISCUSSION:

This RCT aimed to compare two treatment protocols. The first treatment protocol is stretching exercises and second one is grade I and grade II manual mobilization techniques and with both treatment protocol, strengthening exercises taught as a home treatment program. The result of the present study after statistically

analysis showed that treatment protocols provided in both groups decreases pain and disability in the management of NP. Both treatments showed that similar significant findings are present in both groups in terms of reducing pain, restoring ROM and functions. Two outcome measures were used. One is NPRS and other one is NDI questionnaire.

Chronic NP with prevalence rate of 30%, and affecting 10% of older adults, results in significant socioeconomic burden and disability (15). Neck pain is the most common morbidity among the population aged 15–65 years old and the burden of NP that involves both persons with NP and healthcare providers with experiences of managing them (16).

Along with considerable costs for the individual and the society, NP is a frequent source of disability causing human suffering and affecting the well-being of individuals (17). Recent studies by Diaz et al. and Oscar et al. are in line with our results that stretching and manual exercises are effective in NP issues (18,19). Another investigation supported our findings by suggesting that NP can be treated through different interventions including joint manipulation, joint mobilization, traction, soft tissue therapy, exercises, medications, electrotherapy modalities, multimodal treatment (combination of two different modalities for example exercises with mobilization and medication), acupuncture, education and advising programs (20).

It has been well established that NP is associated with functional disability that they are also associated with decreased quality of life and productivity of workers (21). Neck pain has a substantial impact on healthcare costs; the economic burden of NP is widespread because it affects patients, insurers, governments and employers through sick leave, disability, visits to healthcare providers and loss of productivity (22). A study conducted in 2016 consolidated our point of view in favor of that of specific strengthening exercises of the neck, scapulothoracic and shoulder for NP (23). On the other hand, another recent research claimed that muscles energy techniques are more effective as compared to stretching exercises (24).

We used internationally acceptable methods including NPRS for pain assessment, and NDI questionnaire for disability, while using both treatment strategies. Suboptimal time management seems to be the only weakness of study. Moreover, having small sample size and short follow-up means this study is not conclusive. However, it does indicate need for further larger multi center studies in this area.

## CONCLUSION:

This clinical trial concluded that stretching or manual mobilization is equally effective to reduce pain and disability. Hence, improve the quality of life in chronic NP survivors.



**Acknowledgement:**

We acknowledge all the participants of this study.

**Conflict of Interest:**

The authors declared no conflicting interest.

**Source of Funding:**

Self-funded.

**Ethical clearance:**

Taken from institution ethical committee.

**REFERENCES:**

1. Do HJ, Shin JS, Lee J, Lee YJ, Kim MR, Cho JH, Kim KW, Ha IH. Comparative effectiveness and economic evaluation of Chuna manual therapy for chronic neck pain: protocol for a multicenter randomized controlled trial. *Trials*. 2018 Dec; 19(1):663.
2. Evans G. Identifying and treating the causes of neck pain. *Medical Clinics*. 2014 May 1; 98(3):645-61.
3. Posch M, Schranz A, Lener M, Senn W, Äng BO, Burtscher M, Ruedl G. Prevalence and potential risk factors of flight-related neck, shoulder and low back pain among helicopter pilots and crewmembers: a questionnaire-based study. *BMC musculoskeletal disorders*. 2019 Dec; 20(1):44.
4. Shabbir M, Rashid S, Umar B, Ahmad A, Ehsan S. Frequency of neck and shoulder pain and use of adjustable computer workstation among bankers. *Pakistan journal of medical sciences*. 2016 Mar; 32(2):423.
5. Herman PM. Manipulation and Mobilization for Treating Chronic Nonspecific Neck Pain: A Systematic Review and Meta-Analysis for an Appropriateness Panel. *Pain Physician*. 2019 Mar; 22:E55-70.
6. Diego IM, Fernández-Carnero J, Val SL, Cano-de-la-Cuerda R, Calvo-Lobo C, Piédrola RM, Oliva LC, Rueda FM. Analgesic effects of a capacitive-resistive monopolar radiofrequency in patients with myofascial chronic neck pain: a pilot randomized controlled trial. *Revista da Associação Médica Brasileira*. 2019 Feb; 65(2):156-64.
7. Celenay ST, Akbayrak T, Kaya DO. A comparison of the effects of stabilization exercises plus manual therapy to those of stabilization exercises alone in patients with nonspecific mechanical neck pain: a randomized clinical trial. *Journal of orthopaedic & sports physical therapy*. 2016 Feb; 46(2):44-55.
8. Kanga I, Severn M. Manual Therapy for Recent-Onset or Persistent Neck Pain: A Review of Clinical Effectiveness and Guidelines.
9. Lee MH, Park SJ, Kim JS. Effects of neck exercise on high-school students' neck-shoulder posture. *Journal of physical therapy science*. 2013 May 25; 25(5):571-4.
10. Cohen SP. Epidemiology, diagnosis, and treatment of neck pain. In *Mayo Clinic Proceedings* 2015 Feb 1 (Vol. 90, No. 2, pp. 284-299). Elsevier.
11. Ris I, Juul-Kristensen B, Boyle E, Kongsted A, Manniche C, Søgaard K. Chronic neck pain patients with traumatic or non-traumatic onset: differences in characteristics. A cross-sectional study. *Scandinavian journal of pain*. 2017 Jan 1; 14(1):1-8.
12. León-Hernández JV, Martín-Pintado-Zugasti A, Frutos LG, Alguacil-Diego IM, de la Llave-Rincón AI, Fernández-Carnero J. Immediate and short-term effects of the combination of dry needling and percutaneous TENS on post-needling soreness in patients with chronic myofascial neck pain. *Brazilian journal of physical therapy*. 2016(AHEAD):0-.
13. Hidalgo B, Hall T, Bossert J, Dugeny A, Cagnie B, Pitance L. The efficacy of manual therapy and exercise for treating non-specific neck pain: A systematic review. *Journal of back and musculoskeletal rehabilitation*. 2017 Jan 1; 30(6):1149-69.
14. Tunwattanapong P, Kongkasuwan R, Kuptniratsaikul V. The effectiveness of a neck and shoulder stretching exercise program among office workers with neck pain: a randomized controlled trial. *Clinical rehabilitation*. 2016 Jan; 30(1):64-72.
15. Kaiser JT, Lugo-Pico JG. *Anatomy, Head and Neck, Cervical Vertebrae*. Stat Pearls Pub
16. Beurskens AJ, Swinkels RA, Pool JJ, Batterham RW, Osborne RH, de Vet HC. The burden of neck pain: it's meaning for persons with neck pain and healthcare providers, explored by concept mapping. *Quality of Life Research*. 2016 May 1; 25(5):1219-25.
17. Hoy D, March L, Woolf A, Blyth F, Brooks P, Smith E, Vos T, Barendregt J, Bloore J, Murray C, Burstein R. The global burden of neck pain: estimates from the global burden of disease 2010 study. *Annals of the rheumatic diseases*. 2014 Jul 1; 73(7):1309-15.
18. Pico-Espinosa OJ, Aboagye E, Côté P, Peterson A, Holm LW, Jensen I, Skillgate E. Deep tissue massage, strengthening and stretching exercises, and a combination of both compared with advice to stay active for subacute or persistent non-specific neck pain: A cost-effectiveness analysis of the Stockholm Neck trial (STONE). *Musculoskeletal Science and Practice*. 2020 Apr 1;46:102109.
19. Díaz-Pulido B, Pérez-Martín Y, Pecos-Martín D, Rodríguez-Costa I, Pérez-Muñoz M, Calvo-Fuente V, Ortiz-Jiménez MF, Asúnsolo-del Barco Á. Efficacy of Manual Therapy and Transcutaneous Electrical Nerve Stimulation in Cervical Mobility and Endurance in Subacute and Chronic Neck Pain: A Randomized Clinical Trial. *Journal of Clinical Medicine*. 2021 Jan;10(15):3245.
20. Yang H, Hitchcock E, Haldeman S, Swanson N, Lu ML, Choi B, Nakata A, Baker D. Workplace psychosocial and organizational factors for neck pain in workers in the United States. *American journal of industrial medicine*. 2016 Jul; 59(7):549-60
21. Ye S, Jing Q, Wei C, Lu J. Risk factors of non-specific neck pain and low back pain in computer-using office workers in China: a cross-sectional study. *BMJ open*. 2017 Apr 1; 7(4):e014914.
22. Trinh K, Graham N, Irnich D, Cameron ID, Forget M. Acupuncture for neck disorders. *Cochrane Database of Systematic Reviews*. 2016(5).
23. Gross AR, Paquin JP, Dupont G, Blanchette S, Lalonde P, Cristie T, Graham N, Kay TM, Burnie SJ, Gelley G, Goldsmith CH. Exercises for mechanical neck disorders: A Cochrane review update. *Manual therapy*. 2016 Aug 1; 24:25-45.
24. Ali S, Ahmad S, Jalal Y, Shah B. Effectiveness of Stretching Exercises Versus Muscle Energy Techniques in the Management of Upper Cross Syndrome: JRCRS. 2017; 5 (1): 12-16. *Journal Riphah College of Rehabilitation Sciences*. 2017 Mar 10;5(1):12-6.