Comparison between immediate effects of soft tissue mobilization along with stretching exercises and without stretching exercises in patients with mechanical neck pain

Rabab Kompal[1], Zahra Jabeen[2], Muhammad Kashif[3]

ABSTRACT

Objective: To measure whether soft tissue mobilization along with stretching exercises improves level of disability or stretching exercises alone increases neck range of motion in patients with mechanical neck pain.
Study Design: A randomized comparative trial
Place and Duration: At Royal Institute of Medical Sciences Physiotherapy Clinic Multan, in four months from 1st January 2017 to 30th April 2017.
Methodology: Fifty patients who met inclusion criteria were randomly placed into two groups. Group A, received hot pack and neck stretching exercises and group B, received hot pack, neck stretching exercises and soft tissue mobilization (STM). Immediate effects post intervention was documented by measuring range of motion (ROM) using goniometer; pain intensity was measure by Visual Analogue Scale (VAS), Global Rating of Change Scale (GROC) and disability scores on Neck disability index (NDI) 2-4 days post treatment.
Results: The STM group reported a significant improvement on the GROC (p=0.001) immediately after treatment (post treatment). There was no difference between groups for the NDI post-test values, there is statistical insignificance (P=0.408) between treatment and control group on disability. There is statistical significance (P=0.000) between treatment and control group in pain that was measured by VAS.
Conclusion: Soft Tissue Mobilization is effective to relief neck pain immediately and improves range of motion but not up to a mark. Moreover, Soft Tissue Mobilization does not improve levels of disability as compare to the stretching exercises.
Keywords: Neck pain, Soft tissue, Mobilization, Mechanical, Stretching exercises, Hot pack, Treatment

How to Cite This:
Kompal R, Jabeen Z, Kashif M. Comparison between immediate effects of soft tissue mobilization along with stretching exercises and without stretching exercises in patients with mechanical neck pain. Isra Med J. 2019; 11(2): 96-100.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Student of MS Physical Therapy, The University of Faisalabad, Faisalabad Pakistan
2. Assistant Professor of Rehabilitation Sciences, The University of Faisalabad, Faisalabad Pakistan
3. Assistant Professor of Rehabilitation Sciences, Riphah International University, Faisalabad Pakistan

Correspondence to:
Dr. Muhammad Kashif
Assistant Professor of Rehabilitation Sciences,
Riphah International University Faisalabad, Faisalabad Pakistan.
Email: Kashif.shaffi@gmail.com

Received for Publication: 07-06-18
1st Revision of Manuscript: 08-09-18
2nd Revision of Manuscript: 20-10-18
3rd Revision of Manuscript: 12-11-18
4th Revision of Manuscript: 27-11-18
5th Revision of Manuscript: 18-03-19
Accepted for Publication: 17-04-19

INTRODUCTION

Neck pain is a musculoskeletal disorder common to the general population around the world and in all ages[1]. Neck pain is the leading cause of disability among young adults and in older population[2]. Some causes of neck pain include disc herniation , disc degeneration, spinal stenosis, arthritis, muscle tension, trauma or injury, or more severe conditions such as cancer[3,4]. Mechanical neck pain is due to poor posture that causes too many stresses and strain on the muscles. Muscles of neck become tender due to prolonged and static postures Mechanical neck pain or disorders are hindrance to the individuals in performing their daily activities[5]. One of the most common causes of visiting health care providers, including orthopedists and physiotherapists, is neck pain with enormous financial burdens per year[4]. Many non-invasive treatment techniques; includes cervical collar, physiotherapy including manipulation, mobilization, exercise therapy, stretching exercises soft tissue work, and electrotherapy including shortwave diathermy, ice application and transcutaneous electrical nerve stimulation, and acupuncture program, analgesics, NSAIDs and steroids are available the treatment of neck pain[6,7]. Soft tissue mobilization (STM) of spinal segments is commonly used in clinical practice to

treat nonspecific neck pain, but overall, the role of manual therapy (manipulation) in the treatment of nonspecific neck pain in acute, subacute, and chronic stages is still controversial[8]. STM is defined as the mobilization of muscles and its related connective tissues which support it i.e. tendons and ligaments, these all are classified as soft tissues of the body[9]. Stretching exercises especially static stretching are useful in reducing neck pain and ultimately decrease the level of disability and improves cervical ROM[10]. Stretching and resistance training were used to correct muscular imbalance at the neck and shoulder. Forward shoulder or rounded shoulder posture was improved after 16 weeks of treatment with stretching exercises and resistance training and pain ultimately decreased[11].

The rational of our study is that very few studies on neck pain are being conducted to investigate the effects of soft tissue mobilization. This study will elucidate the aspect of soft tissue mobilization of manual therapy. Irrespective of neck pathologies soft tissues are vulnerable for dysfunction and can cause pain spasm vicious cycle. There is very limited data available on topic of study as comparison of the immediate effects of soft tissue mobilization and stretching exercises in patients with mechanical neck pain. In particular, no study has yet been conducted in Pakistan to measure the effects of soft tissue mobilization on patients with mechanical neck pain.

It was hypothesized that patients who received STM with stretching exercises would determine greater improvements in pain and function, and in measures of ROM, than did patients who received stretching exercises only. The aims of study to measure the effects of STM on patients with neck pain, compare the effects of STM with stretching exercises, and see if STM along with stretching exercises decreases the level of disability in patients with mechanical neck pain or stretching exercises alone the neck ROM. So this study was conducted with an objective to measure whether soft tissue mobilization along with stretching exercises improves level of disability or stretching exercises alone increases neck range of motion in patients with mechanical neck pain.

METHODOLOGY

This Randomized controlled trial was conducted at Royal Institute of Medical Sciences Physiotherapy Clinic Multan, in four months from 1st January 2017 to 30 April 2017. Total 50 female patients of age 17 to 30 years are included on the basis of inclusion exclusion criteria after taking informed consent from them. Patients with moderate neck pain 4-6 on Visual Analogue Scale (VAS) who work in static postures for long duration of 17-30 years of age and having pain for more than 3-6 months were included in study. Patients with any bony lesion, with red flags marked on the medical evaluation questionnaire as a tumor, fracture, metabolic history disease, prolonged history of corticosteroids and with severe pain use were excluded. Participants were randomly allocated into experimental and control groups by using purposive sampling technique in order to study two intervention. Group A (control) patients received hot pack for 20 minutes and passive neck stretching exercises and Group B (Treatment) patients received soft tissue mobilization, passive neck stretching exercises and hot pack for 20 minutes. Ethical approval was taken from Ethical and Research Review Committee of The University of Faisalabad. Standardized questionnaire Global Rating of Change Scale (GROC) was the primary outcome measure tool to record data from the participants for this study. GROC is a reliable and valid scale to measure immediate effects of a treatment given to the patient[12]. It shows about how the patient has perceived the treatment given by the therapist to the patient and how his condition has been improved after treatment[13]. Pain Intensity was measured by using VAS before and immediately after giving treatment to the patient. ROM was measured before and after treatments by using standard goniometer[14]. Neck pain disability index (NDI) questionnaire was filled by the patients before treatment and 3 days after treatment for follow up.

Intervention: STM techniques included kneading, pulling, transverse strumming and skin rolling for 15mins. Manually pressure was applied to the muscles and soft tissues of the neck and shoulder in a deep manner in the form of strokes. If the patient reported any increase in their symptoms other than a sensation of local tenderness in the region that the soft tissue mobilization was being applied, the therapist either decreased the amount of pressure. The procedure lasted a total of 15 minutes[15]

Out of those 15 minutes' start was taken from skin rolling technique for first 2 minutes then pulling was applied for 2 minutes. Afterwards strumming and kneading were applied for 2, 2 minutes. All techniques were started with grade I and then moved to grade II according to the patient's response. Then again skin rolling was applied for 2 minutes. Kneading was applied for 2 minutes and transverse strumming was applied for 1 minute. At the end of the session pulling was applied for 2 minutes along with skin rolling.

Stretching exercises were performed in the following order; stretching towards lateral flexion for the upper part of the trapezius, ipsilateral flexion and rotation for the scalene and flexion for the extensor muscles, holding each movement for 30 seconds. Each exercise was repeated for 3 times. Stretching was mainly applied to stretch neck extensors by flexing the neck. Stretching exercises mainly focused upper fibers of trapezius that was stretched by laterally flexing the neck to both sides. Scalene muscles were stretched of both sides[16]

Hot Pack was given for 20 minutes. Hot packs provides superficial heating and it is useful in improving tissue extensibility before applying stretching exercises than applying no heat before stretching exercises[17]

Data Analysis: Statistical Package for Social Sciences (SPSS) 18 was used for data analysis. Quantitative variables were presented by using mean ± SD. Paired Sample t-test was used to measure the changes within the groups while across the group comparison was completed by using Independent Sample t-test. To see the effects of soft tissue mobilization on mechanical neck pain MANCOVA and ANCOVA was conducted.

RESULTS

A total of 50 patients distributed equally in two groups. There were 19 patients who were 19-22 years old, 16 patients were 23-26 years old and 15 patients were 27-30 years old. Thirty seven working women and 13 house wives were included in the study. The significance level declares for the p-value for each test and the outcome measures was (P-value = 0.05).

The results showed that there are significant differences in GROC before and after treatment (p = 0.001), signifying that STM immediately improves neck pain. There was a statistical significance between the treatment and the control group for pain evaluation in the VAS (p = 0.000), which means that the pain is reduced. The p-value (P = 0.408) for the NDI showed that there was no difference between the treatment and control groups, meaning that treatments for both groups did not improve the degree of disability (Table-I)

Table-I: Outcome measures values between two groups (N=50)

	Before intervention		After intervention		P Value
Outcome Measures	Group B (n=25) Mean ±SD	Group A (n=25) Mean ±SD	Group B (n=25) Mean ±SD	Group A (n=25) Mean ±SD	
VAS	05.36± 0.57	05.24± 0.66	04.28± 0.84	04.16± 1.07	.000
NDI	10.36± 2.97	10.44± 2.77	10.48± 4.91	9.40± 5.77	0.408
GROC			2.76± 0.93	1.68± 1.28	.001

* VAS: Visual Analogue Scale
* GROC: Global Rating of Change Scale
* NDI: Neck disability index

From a statistical point of view, both interventions are effective to enhance cervical ROM, including cervical flexion and extension, right and left cervical rotation, and right and left cervical flexion (p <0.05). (Table-II). Similarly, the cluster bar (Figure-1) shows the ranges of cervical flexion and extension, right and left flexion, right and left cervical rotation before and after the intervention. The ROMs improves both in the treatment group and in the control group.

Table-II: Means values for neck range of motions between two groups (N=50)

	Before intervention		After intervention		P Value
Variables	Group B (n=25) Mean ±SD	Group A (n=25) Mean ±SD	Group B (n=25) Mean ±SD	Group A (n=25) Mean ±SD	
Cervical Flexion	39.20± 3.35	39.40± 3.64	40.56± 3.11	40.64± 3.88	.001
Cervical Extension	39.64± 2.94	39.08± 3.13	40.64± 3.09	40.60± 2.96	.001
Right Side Flexion	39.72± 3.39	38.84± 3.24	41.00± 3.35	39.60± 3.16	.001
Left Side Flexion	40.64± 3.09	41.68± 3.38	41.76± 2.68	42.64± 2.90	.001
Right Cervical Rotation	74.64± 3.21	74.48± 3.40	76.32± 2.54	75.72± 3.29	.001
Left Cervical Rotation	74.08± 3.71	74.84± 2.90	75.32± 3.83	76.28± 2.88	.001

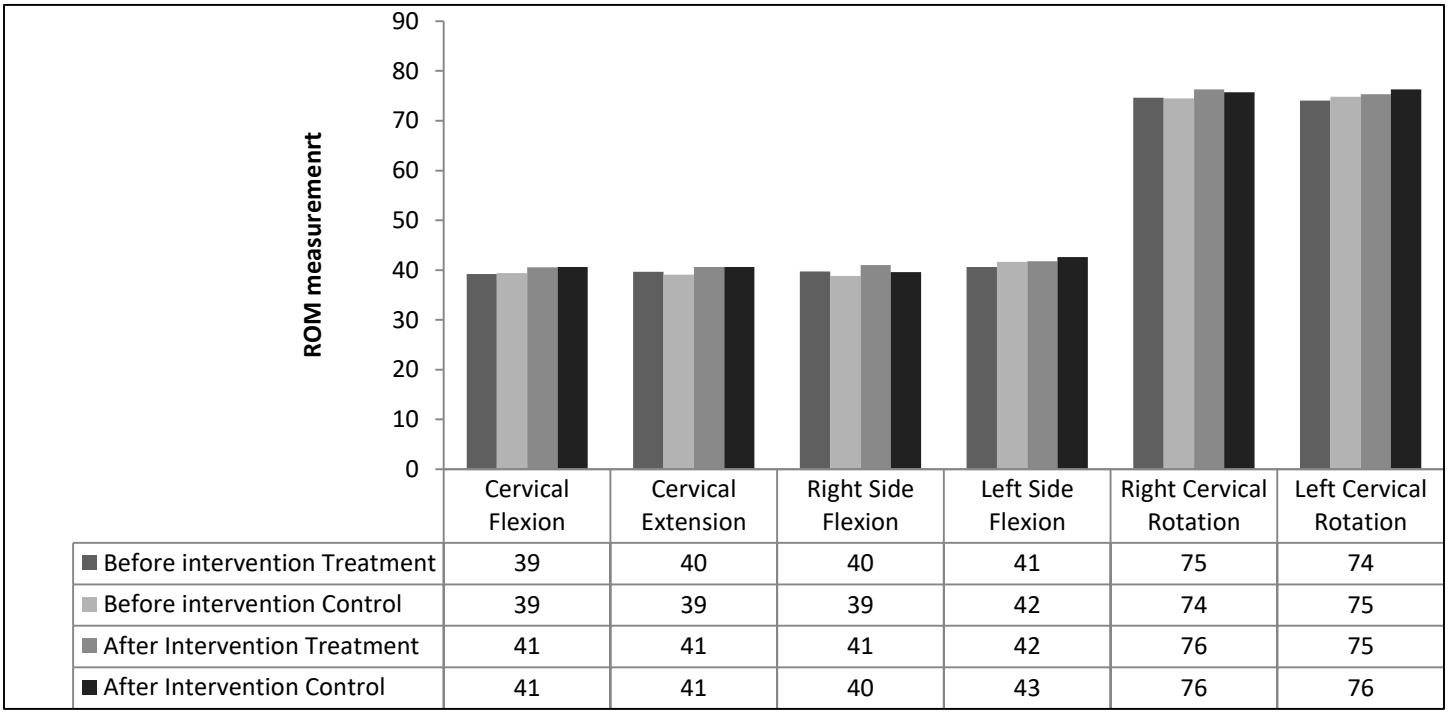

Fig-1: ROM measurements before and after intervention both in treatment and control group. (N=50)

DISCUSSION

The finding of this study shows that there was statistical significance for pain on visual analogue scale. Patients who were treated with STM reported more decrease in pain as compare to the patients who received stretching exercises only as a treatment. These findings are corroborated by a study showing a comparison between STM and therapeutic ultrasound and it has been reported that patients receiving STM as a treatment showed more numerical pain scale improvements compared to patients receiving therapeutic ultrasound[9]. The finding of the current study are further supported by a study which concluded that STM with improving pain it also decreases level of disability and improves ROM[18]. Moreover, conducted study presenting that soft tissue mobilization or massage is effective in treatment and reducing intensity of neck pain. Pain intensity after applying soft tissue mobilization is effective in reducing pain on the neck pain intensity scale[19]. These results are in contrast to a study concluded that mobilization or soft tissue massage alone has no effect in pain relief[20].

The finding of this study revealed that there is statistical significance (p=0.001) for the immediate post treatment values of GROC for the group which was treated by soft tissue mobilization and control group that was only performed stretching exercises. Similar to this, a study concluded that treatment group receiving STM showed more improvements in GROC value post treatment. There were more patients who reported >+3 score on GROC immediate and 4 days after treatment. This value shows that STM is effective and it immediately reliefs pain. Due to its immediate effects STM must be considered for the treatment of neck pain. With improving pain it also decreases level of disability and improves ROM[15]. On the contrary, study concluded that soft STM like massage has weak evidence to be supported to treat neck pain or immediately effective to treat neck pain. Studies included in systematic review did not reach on any conclusion regarding its recommendations whether it should be used or not in practice to treat nonspecific neck pain[21]

Findings of the current study show that mean ROM was increased on both groups. These results are supported by a study concluded that STM alone does not improves ROM. Range of motion was improved when STM was performed along with shoulder exercises[22]. In contrast to the results of current research to the effectiveness of soft tissue mobilization on patients with neck and arm pain was assessed. ROM was measured before and after treatment by using goniometers. Study concluded that there were greater improvements in neck and arm range of motion after performing soft tissue mobilization as compare to the patients who received therapeutic ultrasound as an intervention[9]. Another study contradict the results of current study concluded that there was statistical significance for patients with shoulder pain between treatment and control group. Patients who were treated with soft tissue mobilization showed more improvements in range of motion than the patients who were in control group[23].

CONCLUSION

It is concluded that soft tissue mobilization is effective to relief neck pain immediately. Soft tissue mobilization improves range of motion but not up to a mark as there was statistical insignificance for the treatment and control group. Statistical analysis showed that soft tissue mobilization does not improve levels of disability as compare to the stretching exercises.

LIMITATIONS

The current study was only performed to assess the effects of soft tissue mobilization in patients with mechanical neck pain. Therefore, the result cannot be generalized to soft tissue mobilization for the treatment of shoulder or pain conditions in other musculo-skeletal disorders. In this study, only immediate effects of soft tissue mobilization were found so that the results are only effective immediately after the intervention has ended. The study included only female patients, therefore, the results in male patients cannot be implemented.

RECOMMENDATIONS

Further research to see effectiveness of soft tissue mobilization for short term and long term follow up should be undertaken.

CONTRIBUTION OF AUTHORS

Kompal R: Conceived Idea, Data collection, Manuscript writing, Manuscript final reading and approval
Jabeen Z: Designed research methodology, Statistical analysis, Literature review, Manuscript writing
Kashif M: Data interpretation, Literature search, Critical review, Manuscript final reading and approval

Disclaimer: None.
Conflict of Interest: None.
Source of Funding: None.

REFERENCES

1. Phadke A, Bedekar N, Shyam A, Sancheti P. Effect of muscle energy technique and static stretching on pain and functional disability in patients with mechanical neck pain: A randomized controlled trial. Hong Kong Physiother J. 2016;35:5-11.
2. Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, et al. Manipulation or mobilisation for neck pain: a Cochrane Review. Man Ther. 2010;15(4):315-33.
3. Yelin E, Weinstein S, King T, editors. The burden of musculoskeletal diseases in the United States. Semin Arthritis Rheum; 2016 Dec;46(3):259-260.
4. Kashif M, Zafar M, Asif M, Munawar F. Prevalence of neck pain and adopted posture in drivers. Ann Allied Health Sci 2015;1(1):37-41.

5. Kashif M, Kompal R, Riaz U, Dastgir A, Irum H, Manzoor N. Prevalence of low back, neck and shoulder pain and associated risk factors among senior semester female students of the university of faisalabad. Int J Rehabil Res. 2017;5(01):21-27.
6. Yaqub M, Kashif M, Heera SA. Trends of physiotherapy services, staffing and modalities at physiotherapy centers of Faisalabad. Ann King Edward Med Uni. 2014;20(3):219-27.
7. O'Riordan C, Clifford A, Van De Ven P, Nelson J. Chronic neck pain and exercise interventions: frequency, intensity, time, and type principle. Arch Phys Med Rehabil. 2014;95(4):770-83.
8. Akhter S, Khan M, Ali SS, Soomro RR. Role of manual therapy with exercise regime versus exercise regime alone in the management of non-specific chronic neck pain. Pak J Pharm Sci. 2014;27(6 Suppl):2125-8.
9. Costello M, Puentedura ELJ, Cleland J, Ciccone CD. The immediate effects of soft tissue mobilization versus therapeutic ultrasound for patients with neck and arm pain with evidence of neural mechanosensitivity: a randomized clinical trial. J Man Manip Ther. 2016;24(3):128-40.
10. Mahajan R, Kataria C, Bansal K. Comparative Effectiveness of Muscle Energy Technique and Static Stretching for Treatment of Subacute Mechanical N eck Pain. Intl J of Health and Rehabilt Sci. 2016;1(1):16-24.
11. Ruivo RM, Pezarat-Correia P, Carita AI. Effects of a Resistance and Stretching Training Program on Forward Head and Protracted Shoulder Posture in Adolescents. J Manipulative Physiol Ther. 2017;40(1):1-10.
12. Sharma S, Palanchoke J, Reed D, Abbott JH. Translation, cross-cultural adaptation and psychometric properties of the Nepali versions of numerical pain rating scale and global rating of change. Health Qual Life Outcomes. 2017;15(1):236.
13. Kamper SJ, Maher CG, Mackay G. Global rating of change scales: a review of strengths and weaknesses and considerations for design. J Man Manip Ther. 2009;17(3):163-70.
14. Farooq MN, Bandpei MAM, Ali M, Khan GA. Reliability of the universal goniometer for assessing active cervical range of motion in asymptomatic healthy persons. Pak J Med Sci. 2016;32(2):457.
15. Hertling D, Kessler RM. Management of common musculoskeletal disorders: physical therapy principles and methods: Lippincott Williams & Wilkins; 2006.
16. Ylinen J, Kautiainen H, Wirén K, Häkkinen A. Stretching exercises vs manual therapy in treatment of chronic neck pain: a randomized, controlled cross-over trial. J Rehabil Med. 2007;39(2):126-32.
17. Doner G, Guven Z, Atalay A, Celiker R. Evaluation of Mulligan's technique for adhesive capsulitis of the shoulder. J Rehabil Med. 2013;45(1):87-91.
18. Van den Dolder P, Ferreira P, Refshauge K. Is soft tissue massage an effective treatment for mechanical shoulder pain? A study protocol. J Man Manip Ther. 2010;18(1):50-54.
19. Saha FJ, Schumann S, Cramer H, Hohmann C, Choi K-E, Rolke R, et al. The effects of cupping massage in patients with chronic neck pain-a randomised controlled trial. J Complement Med Res. 2017;24(1):26-32.
20. Gross AR, Hoving JL, Haines TA, Goldsmith CH, Kay T, Aker P, et al. A Cochrane review of manipulation and mobilization for mechanical neck disorders. Spine. 2004;29(14):1541-48.
21. Tsakitzidis G, Remmen R, Dankaerts W, Van Royen P. Non-specific neck pain and evidence-based practice. Eur Sci J. 2013;9(3):34-39.
22. Van den Dolder PA, Ferreira PH, Refshauge KM. Effectiveness of soft tissue massage for nonspecific shoulder pain: randomized controlled trial. Phys Ther. 2015;95(11):1467-77.
23. Godges JJ, Mattson-Bell M, Thorpe D, Shah D. The immediate effects of soft tissue mobilization with proprioceptive neuromuscular facilitation on glenohumeral external rotation and overhead reach. J Orthop Sports Phys Ther. 2003;33(12):713-18.