MOBILIZATION AND MANIPULATION TECHNIQUE FOR PATIENTS WITH MECHANICAL NECK DISORDERS

(SYSTEMATIC REVIEW OF PREVIOUS TRIALS)

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ABSTRACT

Mobilization and Manipulation are commonly used to treat cervical injury.

Purpose and Objectives: To investigate the worldwide experience and opinion onto the use of cervical spinal mobilization and manipulation techniques for patients suffering from mechanical neck disorders.

Methods: Variety of electronic databases such as (MEDLINE (PubMed), EMBASE, and the Cochrane Library) were searched from their inception to 2019 for all English language study trials that directly investigated mobilization and manipulation.

Inclusion and exclusion criteria were applied to select the studies and then were evaluated by using validated criteria.

Results: According to the PEDro scale, a five of high-quality studies that associated to chosen techniques were identified and cited in this updated systematic review, it is clear from the study's findings that manual therapy has shown to be effective in patients with neck disorders.

Conclusions: Manipulation and Mobilization showed benefit in pain relief, however, were more effective when associated with other physiotherapy types for patients with neck disorders.

Key words: *Cervical spine Mobilization, Manual therapy, Mechanical neck disorders.*

INTRODUCTION

Neck disorders are a common musculoskeletal complaint causing varying levels of disability among affected people (Makela et al., 1991). Around 60-70% of the population experience neck pain at some point in their lives (Cleland et al., 2007). Although some patients suffering from cervical skeletal disorders have a low disability level, some can be severely disabled (Linton et al., 1998). The treatment of neck pain is still challenging since the lack of effective interventions (Carroll et al., 2010), therefore, many studies have attempted to evaluate different physiotherapy interventions. The manual therapy intervention including mobilization and manipulation is common method usually used by physiotherapists to manage neck pain (Wolsko et al., 2003). Although there is still confusion among reviews regarding the evidence and its inconclusiveness for applying mobilization and manipulation therapies, some researchers found agreement for applying them, and others advise using both techniques in combination with other interventions. The lack of conclusive evidence on the neck mobilization and manipulation effectiveness confirms the needed for an updated systematic review. In this review, five high-quality studies are systematically reviewed to find out whether manual therapy has significant

results in terms of decreasing pain and increasing functions in patients suffering from neck disorders.

Aims and Objectives of the Research

This systematic review explores and analyses previous worldwide experiences and opinions on the use of cervical spinal mobilization and manipulation techniques for patients suffering from mechanical neck disorders to determine then find out the effective response. It is intended that the research findings will contribute to and support the development of manual therapy intervention for such conditions in the physical therapy field.

METHODS

This systematic review only included randomized controlled trials (RCTs), which comprise a high level of evidence. Only studies focused on cervical mobilization or manipulation, or both, were selected. Several articles on the proposed subject were searched, some of which have met the criteria, and so they were selected to build up this review, whereas most other searches were excluded since they did not met the criteria of this study, resulting in the final inclusion and systematic review of five papers involving 560 patients who met the inclusion criteria.

RESULTS

Farooq et al. (2018) conducted an RCT investigating the effects of neck mobilization in patients with chronic neck pain. They randomised 68 participants with chronic mechanical neck pain to 34 patients in the multi-modal mobilization group and 34 patients in the routine physical therapy group. The following tools were used for evaluation before and after the treatment:

- Neck disability index (NDI) for disability
- Visual analogue scale (VAS) for baseline values for pain
- Goniometer for ROM
- Neck flexor muscle endurance (NME) for neck muscle endurance
- Over four weeks each patient received 10 sessions, and then all the outcome measures were recorded again. Paired t-test showed significant pre- to post-intervention differences for all tools in the two groups ($p \leq 0.001$ in all cases). An independent t-test showed statistically significant differences for the multi-modal mobilization group as follows:

(VAS 1.57cm $p < 0.001$, NDI 1.74 points $p = 0.001$, NME 18.45 $p < 0.001$, Neck ROM 6.06-8.24 $p < 0.05$)

Yildirim et al. (2016) determined the effects of mobilization applications on neck pain caused by Myofascial Pain Syndrome (MPS). They randomly divided 60 subjects suffering from MPS into two groups, one of which received 10 sessions of transcutaneous electrical nerve stimulation (TENS), ultrasound, and hot pack, while the other received manual therapy (cyriax mobilization and scapular mobilization). The following tools were used for evaluation:

- VAS for neck and head pain
- Algometer for values of local tenderness trapezius muscles
- NDI for disability

Assessment was performed four times during the trial: at the beginning, at the end of the second week, at the end of treatment, and in the third month after the treatment (follow-up). The results showed that the first group exhibited almost no significant reduction in VAS scores for neck and head pain at the end of treatment, while there were significant scores on local tenderness of neck in week two and the three-month follow-up. Decreased NDI scores indicated significance at all assessments after treatment. In the second group, significantly decreased neck disability and neck pain were found

in the evaluations at the end of the treatment period, and significant improvements were recorded in most of the trapezius muscles endurance and local tenderness scores.

Waqas et al. (2016) compared Maitland Thoracic Spine Manipulation (MTSM) and Maitland Cervical Spine Mobilization in chronic unilateral C6 – C7 cervical radiculopathy. 100 patients with chronic unilateral C6 – C7 cervical disc prolapsed symptoms were randomly divided into two groups. Group 1 received MTSM, 10 minutes Mechanical Intermittent Neck Traction (MINT), and Strengthening Exercises (SE), while group 2 received Maitland Neck Spine Mobilization (MNSM), MINT, and SE. The treatment duration was four weeks, with three sessions per week. NDI and Numeric Pain Rating Scale (NPRS) were used to investigation and evaluation. Data was collected at baseline and after two and four weeks of the treatment. The study conclusion rejected the hypothesis that MTSM is more effective than MNSM, based to the calculated p value for NDI and NPRS for group A (MTSM) ($P = 0.000$, less than 0.05).

Gautam et al. (2014) compared Maitland and Mulligan Mobilization in improving neck pain, Range of Motion (ROM) and disability. 30 subjects were randomly divided into three groups with 10 subjects each. Group 1 received conventional intervention, Group 2 received Maitland Mobilization, and group 3 had Mulligan Mobilization. Subjects were given four sessions a week over one month (30 days). NDI, NPRS, and universal goniometer were used to assess the disability, pain, and ROM variables. Significant improvement ($p < .05$) in variables was seen in all groups as shown below:

Group 1

- Flexion: 0-15 days, $p = .03$; 15-30 days, $p = .037$
- Extension: 0-30 days, $p = .019$
- Left side rotation: 0-15 days, $p = .037$
- NPRS: 0-30 days, $p = .013$

Group 2

- Flexion: 0-30 days, $p = .00$; 15-30 days, $p = .008$
- Right side rotation: 0-30 days, $p = .010$; 15-30 days, $p = .010$
- Left side rotation: 0-30 days, $p = .024$
- Left side flexion: 0-15 days, $p = .024$; 15-30 days, $p = .003$
- NDI: 0-15 days, $p = .003$; 15-30 days, $p = .007$
- NPRS: 0-15 days, $p = .001$

Group 3

- Flexion: 0-30 days, $p=.000$; 15-30 days, $p=.000$
- Extension: 0-30 days, $p=.000$; 15-30 days, $p=.002$
- Right side rotation: 15-30 days, $p=.003$ and 0-30 days, $p=.000$
- Left side rotation: 0-30 days, $p=.001$
- Right side flexion: 0-15 days, $p=.008$ and 0-30 days, $p=.003$
- Left side flexion: 0-15 days, $p=.000$ and 0-30 days, $p=.003$
- NDI: 0-15 days $p=.000$, 0-30 days, $p=.000$; 15-30 days, $p=.012$
- NPRS: 0-15 days, $p=.004$; 0-30 days, $p=.013$; 15-30 days, $p=.011$

Hurwitz et al. (2002) evaluated mobilization and manipulation in patients suffering from neck pain in a Health Maintenance Organization (HMO) in the USA. They randomised 336 patients into the four groups: (1) manipulation with and without electrical stimulation; (2) manipulation with and without heat; (3) mobilization with and without electrical stimulation; and (4) mobilization with and without heat. Patients were followed for six months and evaluated for disability and pain at weeks 2 and 6, and at months 3 and 6. Manipulation was high-velocity low-amplitude, with minimal rotation or extension. Mobilization was low-velocity amplitude. The scores revealed no sta-

tistically ($p<.05$) differences between manipulation and mobilization scores at baseline at the varying time points, as shown below:

Week 2

- NPRS difference in severe pain on manipulation: 0.06
- Average pain difference on mobilization: -0.14
- NDI difference on manipulation: 1.03

Week 6

- NPRS difference in severe pain on manipulation: 0.4
- Average pain difference on mobilization: 0.23
- NDI difference on manipulation: 0.92

Month 3

- NPRS difference in severe pain on manipulation: 0.13
- Average pain difference on mobilization: 0.05
- NDI difference on manipulation: 0.05

Month 6

- NPRS difference in severe pain on manipulation: 0.02
- Average pain difference on mobilization: 0.01
- NDI difference on manipulation: 0.46

Table 1. Summary of included studies

Study	Authors	Time frame	Study purpose	Sample size	Results
The effect of neck mobilization and in patients with chronic neck pain	Farooq et al	2018	To determine the effect of mobilization and routine physiotherapy on pain, disability, neck ROM and neck muscle endurance in patients with chronic mechanical neck pain	68 patients	Mobilization + routine physiotherapy are effective to reduce pain increase muscle endurance as well as ROM
the effects of mobilization on neck pain caused by (MPS)	Yıldırım et al	2016	To determine the effects of mobilization on neck pain caused by (MPS)	60 patients	The study support the technique the issue
compare of Maitland Thoracic Spine Manipulation Versus Maitland Cervical Spine Mobilization in Chronic neck pain	Waqas et al	2016	to assess Maitland Thoracic Spine Manipulation Versus Maitland Cervical Spine Mobilization neck pain	100 patients	both groups showed an improvement in neck pain and increasing ROM

comparison of maitland and mulligan mobilization in improving neck pain, rom and disability	Gautam et al	2014	To find out the effectiveness of Maitland mobilization in improving neck pain.ROM and disability. · To find out effectiveness of mulligan mobilization in improving neck pain, ROM and disability · To compare the effectiveness of two different techniques of mobilization in improving pain, ROM and disability	30 patients	“Mulligan mobilization is better than maitland mobilization in improving Pain,ROM and disability
RCT of Chiropractic Manipulation and Mobilization for Patients With Neck Pain	Hurwitz et al	2002	To compared the relative effectiveness of cervical spine manipulation and mobilization for patients with neck pain	336 patients	Cervical spine manipulation and mobilization were effective

DISCUSSION

One of the important points taken into consideration while building up this study was to select a group of relatively recent studies to study variables in the results over a longer period, to assess whether there are significant variables in the effectiveness of this type of intervention based on the results. There are important findings to be considered from this study. The results of Farooq et al. (2018) indicated that combining mobilization and manipulation with routine physical therapy was more effective in reducing pain and disability, and increasing ROM, compared to routine physical therapy only. This supported previous findings of Yildırım et al. (2016), who found that combining manual mobilization and manipulation therapy with standard physical therapy for patients with MPS improved outcomes. Waqas et al. (2016) found a significant reduction in reducing pain and disability and increasing ROM in both groups (receiving MTSM + MINT + SE; and MNSM + MINT+SE), however results were better in patients who received (MTSM + MINT + SE) compared with patients in the other group.

It is also noticeable in the fourth study conducted by Gautam et al. (2014) that Mulligan (mobilization with movement) technique gave excellent results for patients compared to Maitland (mobilization), although both interventions were satisfactory in reducing pain and disability, and increasing ROM.

Hurwitz et al. (2002) showed that both mobilization and manipulation were effective in treating neck pain patients, but the latter was more effective. In addition, using mobilization or manipulation with other treatments, such as heat and EMS, was more effective.

CONCLUSION

In general, and as a result of these studies, there was moderate evidence that manipulation and/or mobilization is beneficial for patients with neck disorders, and while manipulation is the most effective solution, the most beneficial outcomes were observed when using both together, or each individually in combination with other physiotherapy interventions.

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