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Review Article

Efficacy of Manual Therapy in Neck Pain: A Review

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Abstract: Background: Neck pain (NP) is a significant contributor to worldwide disability and poses a considerable financial burden to its stakeholders. Prognosis for chronic neck pain is generally poor, and the associated disability seems to be more persistent than low back pain. 66% of the population will suffer from neck pain at some point during their lifetime. More than one-third of people affected still have low grade symptoms or recurrences more than one year after treatment, often leading to chronic pain. More than one-third of those affected also show signs of mild pain or recurrence after 12 months of management, usually contributing to chronic pain. Different manual therapy methods and strategies exist; a common aspect is the use of hands during therapy which involves both manipulation and mobilization. **Aim:** To determine the recent research evidences for the efficacy of manual therapy in neck pain patients. **Method:** This review mainly includes randomized controlled trails (RCTs). Searching done by Google scholar, Pub med and Pedro from 2010 to 2019. We used terms like- neck pain, mobilization, manipulation, exercise and physiotherapy management. **Result**: Present outcomes shows that manual therapy treatment is effective technique in reducing pain and increasing Range of motion (ROM) in neck pain patients without adverse effects. The search resulted in 150 articles but only 10 articles were selected for the study based on criteria. **Conclusion**: Manual therapy program designed for neck pain treatment can be more effective at increasing neck ROM and reducing pain.
Keywords: Manual therapy, Cervical Spondylitis, Exercise, Neck pain.

Introduction

Neck pain (NP) is a major contributor to impairment globally and creates a tremendous financial threat to its participants. The prognosis for chronic neck pain is usually weak, and the resulting injury appears to be more severe than low back pain [1].

An approximate 66 percent of the population during their lifespan suffers from neck pain at any point during their lifespan. The second most frequent explanation given by patients for using complementary and integrative medicine (CIM) in 2007 was neck pain, followed only by low back pain [2]. The overwhelming amount of neck pain is not caused by endogenous anatomy, and it was called "non-specific" or "mechanical."

Non-specific cervical discomfort is responsible for a huge quantity of direct health insurance expenditures, referrals to primary health facilities, leave due to illness, and the associated lack of

productivity [3, 4]. Most of the non-specific neck pain is not related to neurological symptoms of nerve compression or with significant illness. In few cases, non-specific cervical discomfort is seldom interfering with activities of daily living. Non-specific cervical discomfort poses a significant impediment to normal functioning [5]. More than one-third of those affected also show signs of mild pain or recurrence after 12 months of management, usually contributing to chronic pain [6].

Mechanical neck pain is characterized as a generalized neck pain with or without mechanical features of the shoulder, including symptoms created by sustained posture of the neck, movement, or cervical muscle palpation. In the cervical region, mechanical neck pain is pain, often followed by decreased range of motion (ROM) and physical disability. Neck pain and its associated disease pose a considerable socioeconomic strain on society [7]. EMG bio-feedback, electrical stimulation, thermotherapy, acupuncture, therapeutic exercises, or combination therapies for intense neck pain are not indicated. Manipulation, mobilization and rehabilitation are favored over standard treatment in order to reduce intense neck pain at short-term follow-up [8].

Different manual therapy methods and strategies exist; a common aspect is the use of hands during therapy which involves both manipulation and mobilization [7]. Studies also shown that manual therapy approaches offer sufficient relief for neck pain [9-11]. Such methods include manipulation (i.e. a high speed thrust targeted at spine joints) and mobilization methods that do not require a high speed thrust. Professionals challenge whether abuse of the neck will do more damage than good [12]. Maitland's proposed joint mobilization focuses on the assessment and management of passive oscillatory and rhythmic movements. The assessment is done by palpating and passively moving the area to be treated [13]. Depending on the degree of accessory movements within in the joints, the passive movements are divided into 5 levels. In Grades I and II slow are applied in the early ROM in regions where pain was assessed. Grades III and IV are applied at the end of range, or from the restriction provided by the peri-articular tissues to preserve mobility of joint in the existence of restriction. In Grade V small amplitude with high speed oscillatory movements are applied, also known as manipulation.

Maitland’s sessions are in 4 situations, when the individuals can have acceptable outcomes on condition that they follow gaps between each of the four sessions. It shows that there are 2 to 3 days between the 1st and 2nd cycles; the 2nd to 3rd three to 4 days; the 3rd to last 5 to 7 days [14].

Research Design and Setting

This systematic review includes randomized controlled trails as they provide high quality or evidence base.

Inclusions criteria

- ✓ In this review RCTs articles were used only

(i) If they posed low prejudice chances.

(ii) Where patients with Neck Pain have been allotted randomly to take Manual Therapy or a "no-treatment" group, placebo or additional typical traditional treatment for neck Pain.

(iii) Where instructions for random allocation is necessary and clearly specified.

(iv) Where single-blind assessor or double-blinded assessor design was used.

- ✓ Both male and female patients between 18-60 years of age with acute/sub-acute (<3monts) and chronic (> 3 months) Neck Pain were utilized.

Exclusion criteria

- ✓ Any other languages than English.
- ✓ Any report conducted prior to 2010 was omitted from the survey.
- ✓ Articles left out they did not adhere to Mulligan’s MWM for neck is.
- ✓ Spinal cord research, chiropractic, livestock, and other non-original medical findings have been excluded.

- ✓ The study also omitted studies that did not specifically relate to mobilization with neck mobility or the treatment of musculoskeletal disorders.

Intervention

Considered experiments are those which involve mobilization, Manipulation, different types of exercise irrespective of strength and durations. Exercises programs included, strengthening exercises, flexibility exercises, stretching exercises.

Outcome Measures

The key result tests are VAS, NDI, Goniometry, BDI, Short Form-36, individuals Specific Functional Scale, 12-Item Short-Form Health Survey Physical and Behavioral portion Summaries, DUALER IQ PRO (JTECH Medical, U.S.A.).

Author	Study design	Subject	Intervention	Study Duration	Outcome measure	Result
Lindsay M. Gorrell, Kenneth Beath et al. 2016 [15]	Randomized controlled trial	N=65	Group I: Control group which received stretching only Group II: This group received stretching plus manually applied manipulation (MAM), Group III: This group received stretching plus instrument-applied manipulation (IAM).	One time study Follow-up subjective pain scores were obtained seven days after intervention via phone text message.	The primary outcome was pain and it was measured by using VAS scale and pressure pain thresholds. Cervical range of motion, hand grip-strength, and wrist blood pressure was included as secondary outcomes.	Subjective pain scores in the manually applied manipulation group decreased compared to control (P=.015) at seven-day follow-up. Bilateral cervical rotation (Ipsilateral: P= 0.002; contralateral: P=0.015) and contralateral manipulation lateral flexion (P = 0.001) increased after MAM. On the contralateral side, hand grip-strength to manipulation (P=.013) increased after IAM. No mild or severe adverse effects have been identified. Six occasions have reported mild adverse events (control, 4; MAM, 1; IAM, 1). This study shows that one manipulation of the cervix is capable of producing immediate and short-term benefits for MNP. The study also shows that not all manipulative techniques have the same effect and that neurological or biomechanical factors inherent in each technique may mediate the differences.
Abdullah Al Shehri, Shabana Khan et al. 2018 [16]	Randomized controlled trial	N=50	Group A: This group received conventional therapy (Active, Isometrics exercises, moist hot packs) plus SNAG Group B: This group received conventional therapy (Active, Isometrics exercises, moist hot packs) plus Maitland's mobilization	Duration of study is four weeks, three sessions per week & one session per day.	VAS, NDI, Goniometry for Cervical Range of Motion	In this article, individuals were treated with Maitland mobilization and conventional therapy, and Mulligan (SNAGs) mobilization and conventional therapy in both groups. Both mobilization techniques are clinically significant in reducing the individual's symptoms. But Maitland mobilization is statistically significant in decreasing the individual's symptoms when it is compared Mulligan SNAGs mobilization.
Oznur Buyukturan, Buket Buyukturan et al. 2018 [17]	Randomized controlled trial, double-blind	N=42	Group A: this group received traditional physiotherapy included heat therapy, electrotherapy (TENS, & US therapy), exercises therapy. Group B: This group received traditional physiotherapy-Mulligan mobilization; The MMT was applied in addition to the	10 sessions for 2 weeks 5 days in week for once a day	The cervical vertebrae ROM were measured using an universal goniometer. Depression degree of the participants was measured using BDI which consists of 21 categories with 4 options in each	After therapy ($p < 0,05$), pain, ROM, functional level, kinesiophobia, depression and QoL increased in both classes. When comparing the outcomes of these two therapy systems, it was found that in terms of ROM, kinesiophobia, depression and QoL, the TPMM community had a greater result ($p < 0.05$). MMT has been found to have significant effects on pain, ROM, functional level, kinesiophobia, depression and

			treatment program applied to the TP group. For 2 weeks, individuals received SNAGs five days per week.		category. Short form-36-for review.	QoL in older adults with NP, as long as it is done by a specialist.
Muhammad Tariq Rafiq, Zahoor Elahi et al. 2016 [18]	Randomized controlled trial	N=200	Group-A: This groups participants received mobilization alone Group-B: This groups participants received exercise therapy alone. Group-C: This groups participants were received combined therapy of mobilization and exercise.	Mobilization and/or exercise sessions were performed 3-4 times a week.	VAS, NDI	In the present study researcher found that the combination procedure, mobilization + exercise, was the safest therapeutic choice for neck pain and spasm patients. Though mobilization was best for treating neck pain and spasm patients, it was more successful than exercise. Therefore it was found that combination treatment, mobilization + exercise was the safest therapeutic choice for neck pain and spasm patients.
Andrew M Leaver, Christopher G. Maher et al. 2010 [19]	Randomized controlled trial	N=182	Group-A: Neck manipulation Group-B: Neck mobilization	4 sessions for two weeks.	Time required to recover from neck pain, Numerical Rating Scale, Neck Disability Index, Patient Specific Functional Scale, 12-Item Short-Form Health Survey Physical and Mental Component Summaries.	In the manipulation group the average number of days to regain pain was 47 and in the mobilization group 43. Those received neck manipulation did not recover faster when compared with those who received neck mobilization.
Keun Su Lee, Joon Hee Lee 2017 [20]	RCTs	N=18	Group A: In this group only therapeutic exercise was applied to the upper thoracic & cervical spine. Group B: In this group joint mobilization & therapeutic exercise were applied.	Therapy was given for one hour a day, 3 times a week, for 2 weeks for each group	VAS, neck disability index, ACROM, static balance capacity, & muscle tone were assessed.	In both groups VAS, NDI, & ACROM is improved significantly. Group B improved significantly more on right lateral flexion and rightward rotation. Muscle tone improved significantly in the upper trapezius in both groups. In addition, the group which receive both joint mobilization and therapeutic exercise were applied, significantly more improvement in the pain index, NDI, and ACROM was seen than in the group that received only therapeutic exercise.
Rajesh Gautam, Jagdeep Kaur Dhamija et al. 2014 [21]	Randomized controlled trial	N=30	Group-A: Conventional therapy Group-B: Maitland mobilization techniques Group-C: Mulligan mobilization technique	Four session in one week for total of 30 days.	Pain, disability and ROM were assessed by VAS, Neck Disability Index and universal goniometer.	This research has shown that mulligan mobilization is more effective in improving pain, ROM and disability. While both study groups showed decreased pain , disability and improved ROM, it was observed that mulligan mobilization was more effective in improving pain, ROM and disability.
Sang-Hak Kim, Jin-Ho Choi et al. 2016 [22]	Randomized controlled trial	N=23	Passive group: Kaltenborn's joint Mobilization (12 patient's) Active group: Olaf's Auto-stretching (11 patient's)	One time study	Visual Analogue Scale, DUALER IQ PRO (JTECH Medical, U.S.A.) was used to measure the neck ROM.	There are significant difference in the pain and the ROM in both of two group ($p<.05$). But there are no significant difference pain and ROM between two groups.
Hossam alden al-bassiouny, Salwa shendy et al. 2019 [23]	Randomized controlled trial	N=30	Group-A: Received upper thoracic mobilization and traditional physical therapy program. Group-B: Received the traditional physical therapy program only (IR 15 min, TENS,	Both groups were received a traditional program for 4 weeks, 3 sessions per week.	Pain level was measured by a Visual Analog Scale (VAS) and neck disability was measured by Neck Disability Index (NDI).	There is a statistical significant difference between both groups. There is a positive effect of upper thoracic mobilization on CROM and neck function when comparing with routine physical therapy, there was no a statistical significant effect of upper thoracic mobilization on resting pain level when

			Stretching exercises for Upper Trapezius, Levator Scapulae, Sternocleidomastoid and Scalenes muscles, each stretching exercise maintain 30 second and repeated 5 times for each side.			compared with routine physical therapy.
Saeed Akhter, Muhammad Khan et al. 2014 [24]	Randomized controlled trial	N=62	Group-A: Received manual therapy (manipulation) with supervised exercise regime Group B: supervised exercise regime	Measurements were taken at baseline, after 3 weeks and 12 weeks	Visual Analog Scale (VAS) for pain intensity level (0 to 10) and Neck Disability Index (NDI) were used as outcome measures of interventions.	The results suggested significant reduction in pain intensity level in both groups; over 3 weeks and 12 weeks' time period in relation to baseline on visual analog scale (p=0.001). Similarly, statistically significant improvements noticed in Neck Disability Index (NDI) (p=0.0001) in both groups while looking at baseline data with reference to 12 weeks' time period. On closer inspection, the manual therapy (manipulation) with exercise regime appeared as a favorable treatment preference compared with exercise regime alone.

Discussion

This review was conducted to determine the efficacy of manual therapy approaches in improving quality of life in patients with neck pain. Evidences from RCTs is used to assess the efficacy of manual therapy approaches in neck pain.

There is low to intermediate quality proof that different forms of manipulation and/or mobilization can alleviate pain and improving function for chronic neck pain relative to other treatments. Several prior studies of chronic neck pain show findings in favor of manipulation and mobilization for individuals with chronic neck pain. However, most of these studies also report that methodological flaws render the evidence insufficient or inconclusive, making it inappropriate to conclude that manipulation and/or mobilization are more effective compared to usual care or other complementary and integrative medicine therapies.

In addition to above mentioned evidences, researchers mentioned below also proved manual therapy interventions to be equally effective in decreasing pain and improving ROM in patients with neck pain.

According to Kattela Suneel Kumar et al. [25] therapeutic use of neural mobilization in to cervical traction therapy decreased discomfort and raise ROM in Comparison of post treatment indicates at 2^{nd} and 4^{th} week of therapy there is a statistically improvement ($p<0.05$) difference in improvement in outcome measures between three groups. Adem Yildirim et al. [26] showed on his research that cervical and scapular mobilization procedures have beneficial effects on pain scores head of neck as well as local tenderness scores and endurance of cervical muscles. In addition, these applications may improve neck disability and state anxiety scores of patients with MPS.

Evans et al. [27] studied the effectiveness of manual therapy (MT1 HVLA manipulation) (to the Cx and Tx for 20 sessions of 15–20 minutes) paired with high dose (20 sessions of 1-hour) controlled strengthening exercise (neck and upper body strengthening), versus moderate dose controlled strengthening exercise alone, and low dose home exercise and instruction for chronic NP individuals. There were clinically significant result at 12 weeks for both high dosage exercise groups for pain and general health benefits ($p < 0.001$) in relation to home exercise and a tendency for impairment for MT1 associated with exercise activity towards home exercise. The authors concluded that high dose exercise combined or not with MT1 achieved better outcomes than home exercise especially in the mediumterm (3 months).

Saptute et al. [28] in the first comparative category; even though an exercise plan was introduced on the first control group, making it an successful therapeutic strategy, the same exercise protocol was also introduced on the study group that additionally adopted Mulligan's MWM. thus, MWM represented the only aspect upon which the discrepancies between the groups were contingent. Furthermore, it appears that MWM of peripheral joints, as defined in the Mulligan definition, yields better therapeutic outcome in contrast to a false, passive or no therapeutic solution regarding disability reduction. The outcomes collected from this comparison also appear to be clinically significant [28, 29].

Leticia Bojikian CALIXTRE [30] on his research he observed that the cervical spine therapy treatment involving neck joint mobilization, muscle stretching, and segmental stabilization appears to include significant change in pain-free MMO, self-reported discomfort, and mandibular functioning in subjects with myofascial pain or mixed Temporo mandibular disorders (TMD). Changes showed moderate-to-large effect sizes but small magnitude and no clinical relevance. Nonetheless, the direction of the findings suggests that additional research will start exploring the impact of cervical therapy in subjects with TMD. It will bring up stronger evidence about the indirect approach of TMD by physical therapists.

Diana Gregoletto [31] research had mechanical neck pain and limited cervical ROM in at least one cervical movement. The finding of this study indicate that spinal manipulation, using the Gonstead and Diversified DTV techniques, in the cervical and thoracic spine, may indicate a subjective reduction in pain and produce a significant improvement in neck ROM in individuals with mechanical neck pain. Thavatchai Suvarnnato [32] research validated decreases in VAS pain scores and increases in neck ROM at instant and 24-hour follow-ups from both single level thoracic spine manipulation and thoracic mobilization in chronic neck pain.

Conclusion

This systemic review was conducted to investigate the efficacy of manual therapy methods designed to improve pain and ROM in neck pain patients by summarizing the evidences from randomized controlled trials (RCTs). We conclude that manual therapy program designed for neck pain treatment can be more effective at increasing neck ROM and reducing pain. In addition, neck pain patients can improve self-reported with isometric exercises including ROM exercises, either with or without electrotherapy.

Conflict of Interest: The authors declare that they have no conflicts of interest.

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