



Effectiveness of Cervical Mobilization and Cervical Traction in Management of Non Specific Neck Pain

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ABSTRACT

Background: Neck pain is described as the pain perceived anywhere between superior nuchal line & first thoracic vertebrae. About 60% of the subjects are likely to develop the chronic nature of neck pain if it's not managed promptly.

Objective: This study was designed to determine the effectiveness of manual therapy in comparison with cervical traction in reducing cervical pain and disability.

Methodology: This study is randomized clinical trial in which 38 patients with the non-specific neck pain aged between 35 to 55 years were selected using a non-probability sampling technique from Hope Rehabilitation Centre Lahore. Selected subjects were randomly allocated into two treatment groups with 19 subjects in Cervical Mobilization (Group A) and 19 in Cervical Traction (Group B) using a lottery method. Short wave diathermy & isometric neck exercises were given as standard treatment for both groups. Pretreatment values for pain and disability were recorded on VAS and NDI. Each patient received two treatment sessions per week with maximum six treatment sessions over the period of three weeks. Post treatment values for possible improvement in pain and disability measured on VAS and NDI respectively were recorded at the end of 3rd week.

Results: It was revealed that there was significant difference in VAS and NDI score (p value < 0.05) between the baseline readings and final value at the end of Week 3 (after 06 treatment sessions) across both treatment groups. However cervical mobilization proved to be an effective technique in terms of greater reduction in mean VAS (3.83 ± 0.336 compared to 1.706 ± 0.268 in cervical traction group) and NDI (4.056 ± 0.468 compared to 2.647 ± 0.402 compared to cervical traction).

Conclusion: Cervical mobilization is more effective than cervical traction, both in terms of reducing pain and disability in subjects with non-specific neck pain.

Key Words: Neck Pain, Visual Analogue Scale, Neck Disability Index, Manual Therapy

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INTRODUCTION

Neck pain is one of the most prevalent musculoskeletal disorders among general population after low back pain⁽¹²⁾. About 50% of the subjects referred to physical therapist by general practitioners are of neck pain. It is one of the major source of discomfort, pain and disability accounting for high socioeconomic burden in terms of cost expended on its treatment and number of days missed from work. Prevalence of neck pain ranges from 45% - 60%⁽⁸⁻⁶⁾ in different studies conducted across different parts of globe.

The review of previous literature has revealed that passive joint mobilization techniques are frequently employed by physical therapist to assess for and treat vertebral dysfunction⁽⁷⁻¹¹⁾. During assessment, spinal mobilizations appear useful in identifying the

symptomatic spinal level⁽⁸⁻¹²⁾, and deviations from normal accessory motion may be associated with pain⁽¹²⁻¹³⁾. When used for treatment, there is good evidence to support the combination of joint mobilization and exercise⁽¹⁴⁾.

In a 2008 systematic review by Schmid et al⁽¹³⁾ the authors assessed 15 studies investigating the effects of spinal mobilization alone on pain measures and range of motion. Data were pooled in this review, and the resultant suggestion was that joint mobilization improved outcomes by 20% relative to controls who did not receive mobilizations. Further, similar effects, decreased pain and increased motion, have been observed when mobilization was performed at the asymptomatic level (non-specific level) or at the symptomatic level (the specific level)^(15, 16). The study by Vernon et al¹⁵ and that by



Hegedus et al ⁽¹⁶⁾ only included studies which examined the effects of joint mobilization and not those studies which combined joint mobilization with other interventions.

Spinal traction is one of the conservative treatments that are frequently used for the treatment of several of type of neck and back disorders ⁽¹⁷⁾. Similarly other studies also reported that there was reduction electro myographic activity of the paraspinal muscles along with the widening of inter vertebral foramen that led to reduction in radicular symptoms associated with neck pain ^(18,21).

A study conducted by Rangones et al ⁽²²⁾ found that combination of manual therapy along with cervical traction in addition to baseline treatment of therapeutic exercise to be more effective in reducing pain and disability than any other treatment technique alone. However these results were negated by another study by Young et al ⁽²³⁾ that addition of cervical traction to regime of manual therapy and exercise did not yield any significant benefit in terms of reduction in disability, pain or dysfunction in subjects with cervical radiculopathy.

Though cervical traction is a commonly used treatment technique, its efficacy is yet to be determined over other techniques' like passive joint mobilization ⁽²⁴⁾. There is also no convincing evidence in the previous literature that which sub group of subjects with neck pain are likely to benefit from this technique. Combination of cervical mobilization and cervical traction along with standard baseline treatment have proved be effective in treatment of neck pain but the relative contribution of each technique towards improvement is yet to be evinced. The main aim and objectives of this study was to determine the effectiveness of cervical mobilization versus cervical traction in reducing pain & disability.

METHODOLOGY

This study is a Randomized Clinical Trial. Data was collected from Hope Rehabilitation Centre Lahore and study was at Riphah College of Rehabilitation Sciences Lahore. Study was completed in January 2015 to July 2015 after the approval of synopsis. Patients with the non specific neck pain were

selected using a non probability sampling technique from Hope Rehabilitation Centre Lahore. Sample size of 38 patients, with age 35–55 year, of both genders, with pain perceived anywhere in the region of cervical spine, from superior nuchal line to the first thoracic spinous process ⁽²⁵⁾ and limitation of cervical spine range of motion were included. Patients were not included in the study, if they reported any of the conditions like pregnancy, whiplash injuries, medical red flag history (tumor, fracture, metabolic diseases, rheumatoid arthritis, osteoporosis, resting blood pressure greater than 140/90mmHg), neck pain with cervical radiculopathy, neck pain associated with externalized cervical disc herniation, fibromyalgia syndrome, previous neck surgery and neck pain accompanied by vertigo caused by vertebrobasilar insufficiency or accompanied by non-cervicogenic headaches. Subjects were also excluded if they had received physical therapy in the previous 6 months.

Selected subjects were randomly allocated using a dice roll method into two treatment groups with 19 subjects in Cervical Mobilization group and 19 subjects in Cervical Traction groups using a lottery method. Short Wave Diathermy & isometric neck exercises were given as standard treatment for both groups.

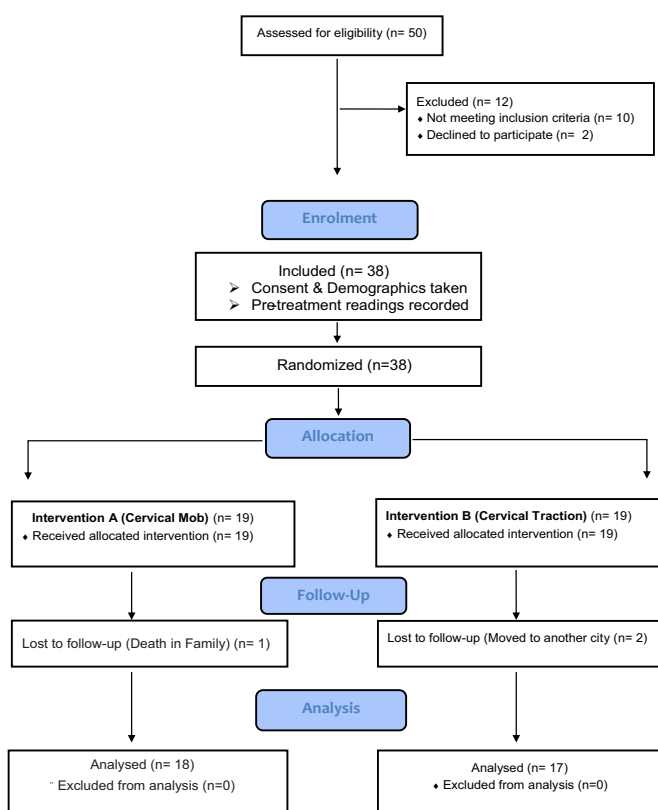
A standardized musculoskeletal examination of the cervical spine was performed to identify the vertebral level to target with the intervention; that is, the level found to be hypo mobile and painful in the manner that matched the patients' primary complaint. Each patient received a total of 06 treatment sessions over 3 weeks.

The patient lay prone and the therapist stood at the head of the patient. His thumbs were placed in opposition at the level of the facet of the hypo mobile cervical vertebra and a unilateral posteroanterior (PA) oscillatory pressure was applied using Grade II and Grade III Maitland's manual therapy techniques. This oscillatory mobilization was performed at a frequency of 2 Hz for 2 min and repeated 3 times. The rest time between each mobilization was 1 min.

The patient lay supine with the head resting on a small pillow and the crown of the head even with the



top edge of the table. The therapist cups the patient's chin with the fingers or cups the anterior aspect of the patient's forehead using non dominant hand. The therapist flexes the patient's neck to a position of comfort by lifting the head off the pillow (20-25 degrees from horizontal) and gradually applies a distraction force up to 8-10 kg. Traction force was maintained for up to 1 minute followed by 30 seconds rest interval.



At each treatment visit, participants received three sets of five repetitions of traction with a neutral head position, delivered within the allocated force range. A Visual Analogue Scale (VAS) ⁽²⁶⁾ was used to evaluate the intensity of the recent pain perceived by the patient. This scale has been documented in previous studies as a reliable and valid measure of pain intensity and it is sensitive to clinical changes in pain. The patient places a vertical mark on a 10 cm horizontal line anchored at one end with 0 (no pain) and at the other end with 10 (maximum pain).

The Neck Disability Index (NDI) is an assessment tool used to record perceived disability in patients

with neck pain ⁽²⁷⁾. The NDI is a self-administered questionnaire with 10 sections: 7 relate to activities of daily living, 2 relate to pain and 1 to concentration. Each of the sections is scored from 0 to 5, and the total score is expressed as a percentage relative to the maximum possible. This scale offers high levels of validity and reliability (Cronbach's alpha score was 0.89); it is stable against different cultural levels and is consistent and reliable ⁽²⁸⁾. The minimum detectable change is 5 points out of 50, and it is recommended that 7 points is the minimum clinically important difference.

Data entry and analysis was done by using SPSS 18. Quantitative variables were presented by using mean \pm SD. Qualitative variables were presented by using frequency table and appropriate graphs where applicable. Paired sample t test was applied to see a significant change VAS and NDI score between pre treatment & post treatment values at the end of 06 treatment sessions with in each group. Independent sample t test was used to compare significant difference in pain and disability between two groups. Chi-square test was applied to see the association between qualitative variables. P-value \leq to 0.05 will be taken as significant.

RESULTS

The patients were recruited from January 2014 to June 2014. 38 subjects with non specific neck pain were eligible for the study. 35 subjects completed all the assessment. Primary reason for dropout was death in family and migration to another study. Demographic variables like age, BMI and male female ratio are reported in Table I.

Table I: Demographics measures presented by groups, all data presented as Mean (SD)

| Characteristics | Cervical Mobilization Group Mean \pm SD | Cervical traction Group Mean \pm SD |
|--------------------------|--|--|
| Age (Years) | 44.66 \pm 6.69 | 46.76 \pm 6.40 |
| BMI (kg/m ²) | 26.65 \pm 3.06 | 25.34 \pm 3.21 |
| Sex M/F (Male %) | 11/7 (61%) | 11/6 (64.7) |

Mean age of participants in cervical



mobilization group was 44.66 ± 6.69 years and cervical traction group was 46.76 ± 6.40 years. Both groups had higher percentage of male participants compared to female participants.

Table II: Across the group difference for VAS & NDI, with p value

| Measure | Group | Baseline | Final | Within Group Change | P value |
|---------|-----------------------|------------------|------------------|---------------------|---------|
| VAS | Cervical Mobilization | 6.55 ± 0.983 | 2.72 ± 0.826 | 3.83 ± 1.42 | <0.001 |
| | Cervical Traction | 6.70 ± 0.581 | 5.00 ± 0.707 | 1.706 ± 1.10 | <0.001 |
| NDI | Cervical Mobilization | 15.05 ± 2.79 | 11.00 ± 1.49 | 4.056 ± 1.98 | <0.001 |
| | Cervical Traction | 14.88 ± 2.97 | 12.33 ± 2.30 | 2.647 ± 1.65 | <0.001 |

Across the group analysis was done using independent sample t test which showed that there was significant difference between the two treatment groups with p value < 0.001. Within the group difference was analyzed using paired sample tests. Results demonstrate that there was significant difference across the both treatment group for VAS score and NDI score (Table II). There was a mean difference of 3.83 ± 1.42 across the cervical mobilization group compared to cervical traction group that demonstrated a mean difference of 1.706 ± 1.10 . Similar down sloping trend was also observed for NDI score. There was a mean reduction of 4.056 ± 1.98 & 2.647 ± 1.65 across the cervical mobilization & cervical traction group respectively. Overall there was greater reduction in pain and disability measured on VAS & NDI across the cervical mobilization group compared to cervical traction group. (Table I & Table II)

DISCUSSION:

Results of this found that there was significant difference in VAS and NDI score (p value < 0.05) between the baseline readings and final value at the end of Week 3 (after 06 treatment sessions) across both treatment groups. However manual therapy proved to be an effective technique in terms of greater reduction in mean VAS (3.83 ± 0.336 compared to 1.706 ± 0.268 in cervical traction group) and

NDI (4.056 ± 0.468 compared to 2.647 ± 0.402 compared to cervical traction).

Results of this study reinforce and augment the fact that manual therapy had a positive significant effect over neck pain. The magnitude of improvement was set at 0.85cm on VAS scale⁽²⁹⁾, was met with in first week of treatment in manual therapy group and only in second week of treatment in cervical traction group. The short term effects found in this study were also reported by another study conducted by Saavedra-Hernandez et al⁽³⁰⁾. There was also improvement in terms of Neck Disability Index across the both treatment group with greater reduction in manual therapy group compared to cervical traction. However none of the both technique exceeded the minimal clinical important detectable difference (MCID) of 7 points on Neck Disability Index. Previous studies have reported the change in NDI score differently. There was significant change of 7 points on NDI following a 6 weeks of manual therapy in a study conducted by Hoving et al⁽³¹⁾. Similarly there was change of 9.6 and 7.9 in NDI after 4 weeks of treatment and 9.3 to 10.8 after 12 weeks; were reported in study by Leaver et al that compared HLVA and mobilization in subjects with non specific neck pain⁽³²⁾. One possible explanation to this difference might be inclusion of subjects with chronic neck pain that required a greater number of treatment session to produce a significant effect.

Results of this study also found cervical traction to be effective in terms of overall improvement in VAS and NDI score (though less than manual therapy group). A significant change in VAS was only documented after 4 treatment sessions in week 2. There was also significant improvement only in 1st week of treatment in NDI score (p value < 0.05), but later on week 2 and 3 there was no significant reduction in NDI score. Result of this study were further testified by Joghataei et al⁽³³⁾ that registered a short term improvement in grip strength only after 3 weeks of treatment in patients with cervical radiculopathy subjects when they were treated with cervical intermittent traction in supine position. It was further concluded in this study that there was no midterm superiority of this technique over other conservative treatment approaches.



Results of previous studies found cervical traction only to be effective in conjunction with other therapies⁽⁸³⁾. A study confirmed that significant reduction in symptoms of radicular pain when they were treated with vertical cervical traction in sitting position with grade I-III spondylosis⁽⁸⁴⁾. 24 out of 26 subjects also recovered effectively when cervical traction was added to their conservative treatment for neck pain⁽⁸⁵⁾.

In the study by Cleland et al⁽⁸⁶⁾, 11 subjects with cervical radiculopathy were treated with cervical traction along with their previous treatment regime of cervical manipulation and therapeutic exercises. Results showed that there was improvement in pain and function after an average of 7 treatment sessions. Another study⁽⁸⁷⁾ used a different technique of traction; cervical bath traction and combined it with electrotherapy and standard therapeutic exercises. The other group received exercises and electrotherapy alone. The combination group receiving cervical traction was superior to other in terms of pain, spinal mobility, function and quality of life parameters at the end of a 15-session treatment protocol and 3 months later. The authors also suggested the use of cervical weight bath traction in cases of radicular pain caused by disc protrusion or cervical spondylosis.

CONCLUSION

On the basis of results of the study it may be concluded that cervical Mobilization is more effective than cervical traction, both in terms of reducing pain and disability in subjects with non specific neck pain.

LIMITATIONS

Lastly, all participants were residents in one area of Lahore with subsequent similarity at socio-economic scale and cultural level, making it difficult to generalize the results to other populations that differ from that group.

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