International Journal of Health Sciences and Research
www.ijhsr.org ISSN: 2249-9571

Original Research Article

A Comparative Study of Finding the Efficacy of Thrust Manipulation versus Non Thrust Mobilization on Thoracic Spine in Patients with Mechanical Neck Pain

Nityal Kumar Alagingi[1], Belle Sharvani Praveen Kumar[2]

[1]Lecturer, JSS College of Physiotherapy, Mysuru, Karnataka,
[2]Lecturer, JSS College of Physiotherapy, Mysuru, Karnataka

Corresponding Author: Nityal Kumar Alagingi

ABSTRACT

Introduction: Mechanical neck pain has a lifetime prevalence of nearly 50%, estimates suggest that 70% of the population will experience neck pain during their life. Several studies implicate cervical and thoracic spine in causing neck pain. Recent evidence suggests that symptoms of mechanical neck pain can be effectively reduced by using non-thrust mobilisation and thrust manipulation directed to thoracic spine. This study was aimed to find the efficacy of two treatment techniques in reducing symptoms of patients with mechanical neck pain.

Experimental Section: A total of 25 patients were included in this study, later randomised into two groups, Group A received upper thoracic junction manipulation and group B received non thrust mobilisation. Both groups received treatment twice a week for three weeks. Efficacy was assessed by NDI, NPRS at baseline and end of third week.

Results: Both Groups showed significant improvement with in groups but no significance between groups. Thrust manipulation group has immediate pain relief comparing to non thrust

Conclusion: The present study concluded that Both Thrust and non thrust mobilisation are effective in reducing pain and disability.

Key Words: Neck pain, thoracic mobilisation, Thoracic manipulation, Disability. (Included Boolean operators "and" "in")

INTRODUCTION

Neck pain is a common condition affecting the general population during any point of life. [1] Among the working population the most common type of neck pain experienced is mechanical type. It is a nonspecific pain which includes minor injuries or sprains to muscles or ligaments which exacerbated by doing neck movements. [2] In India women are more affected than men, with prevalence about 10 to 50% of population. [3] Common factors contributing for mechanical type neck pain are work related poor posture and somatic dysfunction. Many studies showed Mechanical neck pain is due to forward neck posture. [2-4] where the upper cervical segments assume extension and lower cervical segments assume flexion causing an increase in biomechanical stresses and contribute in increasing the gravitational load moment of the head, which in turn increase in muscle activity of the cervical extensors like upper trapezius, semispinalis capitus, semispinalis cervicis, splenius capitus. This over activity of the cervical extensors puts the deep cervical flexors into mechanical disadvantage position and the continuous stretch leads to weakness of deep cervical flexors and ultimately to mechanical neck pain. [5] Somatic dysfunctions is an altered function of related

components of the somatic (body framework) system like skeletal, arthrodial, and myofascial structures. [6] Spinal somatic dysfunctions may aggravate somatic reactions due to strong biomechanical correlation between lower cervical and upper thoracic spine. [7,8] Fernández -de-la-Pefias et al, related Upper thoracic joint dysfunction is a temporary reduction of mobility in one or more planes in the first four thoracic segments. The concept suggests that a hypo mobile spinal motion segment(s) may produce a symptomatic response from an adjacent hyper mobile spinal motion segment. [8,9] as first thoracic vertebrae shares a common feature of the lower cervical spine. [10] The alignment of thoracic spine plays an important role which affect cervical spine, the patient adapts a forward head position when thoracic spine is kyphotic to maintain the head and eyes in a functional position, an anterior translation of the lower cervical vertebrae is seen which leads to loss or exaggerated cervical lordosis. A posterior translation of the lower cervical vertebrae over thoracic spine can cause decrease in normal thoracic curve and result in flat thoracic spine leading to a stiff thoracic spine, thus leading to excessive forward bending of the cervical region when looking down and finally leading to neck pain. [5] Manual therapy techniques, thrust manipulation and non thrust mobilization are used by Physiotherapists in overcoming the symptoms of mechanical neck pain. Mobilizations are used to restore joint play that has been lost during injury or restriction; they help in improving hydrostatics of the intervertebral disc and bodies, activation of type I & II mechanoreceptors in the capsule of the apophyseal joints and activation of neuromuscular spindle in the intrinsic muscles. [11]

The technique of Thoracic thrust manipulation was developed in 1960 with the goal to restore joint play or a desirable gap between articular surfaces. [12] A unidirectional high velocity low amplitude movement directed at any segment of the thoracic spine including cervico-thoracic junction. Non thrust manipulation was introduced in 1960.It is a passive, skilled technique applied to joints and related soft tissues at varying speed and small amplitudes without thrust using accessory motions for therapeutic purposes. [12]

Outcome measurement used in this study were

1. Neck Disability Index (NDI) a self administered questionnaire in local language with 10 items about pain intensity, personal care, lifting, and work was explained and given to patients for marking each item. It consists of 5 items in each question. Score was 0 as no pain and 5 as very severe (Vermon 1991). [13] Interpretation of scores was calculated as Total score: / 50 x 100 = %
2. The Numerical pain Rating Scale (NPRS) a 11 point scale where readings are from 0 to 10 and patient is asked to mark three points on the scale which correspond to their current, best and worst pain over the past 24 hours and the average of these scores are taken. [14]
3. VAS

Aim and objectives

1. To evaluate the immediate effects of thrust and non-thrust mobilization on mechanical neck pain.
2. To evaluate the effect of thrust and non thrust on pain and disability.

MATERIALS AND METHODS

This study was conducted in JSS hospital, Mysuru. Permission was taken from institutional ethical committee. Participants were recruited by using screening of neck pain and participants from various departments were screened and those willing for therapy were included in the study.

An Experimental study was done with sample size 25 by personal structured interview which included both men and women above 22 years diagnosed with neck

pain. Subjects with recent surgery to cervical or thoracic regions, systemic diseases, osteoporosis, Central or peripheral neurological signs were excluded. They were then randomized into two groups Group A (thrust manipulation) and group B (non thrust mobilization) by chit method, were 12 subjects in group A and 13 in group B were selected. Baseline scores like NDI, NPRS were taken prior to intervention and diagnosis of somatic dysfunction for mechanical neck pain was done which include neck pain without neurologic or vascular deficit, unilateral and bilateral, discomfort with joint challenge/pressure, restriction of movement of motion segments identified by static or motion, palpation and having forward head posture. [15]

Intervention:

Thrust manipulation was given to group A where the subjects are in supine lying with arms crossed over, holding the opposite shoulder and the therapist position is in standing next to the patient. The therapist palms are placed at the back of the subject at the level of the desired vertebrae to be mobilized in a pistol grip, in which the spinous process of the patient are placed in between the middle phalanx and the thenar and the hypothenar muscle. The subject's elbows are drawn inferiorly to create thoracic spine flexion. A high velocity thrust will be given obliquely through subjects elbows using therapist's upper body. Not more than two attempts were done on the same day. Numbers of sessions given are twice in a week for 3 weeks. [16]

Figures 1 & 2: Thrust Manipulation.

Non-thrust mobilization was given to group B where the therapist position is standing at subjects head end and the patient position was prone on a high couch. This group received Maitland's postero-anterior central vertebral mobilization with therapist thumbs held in opposition and back to back, with the tips of the thumb pads on the spinous process of the desired thoracic vertebra to be mobilized. Extremely gentle pressure was applied which would produce a feeling of movement. The alternating pressure was applied by the arm combined with trunk. The duration of the treatment was 30 seconds or 15-20 repetitions for 9 minutes. Number of sessions was twice a week for 3 weeks. [17]

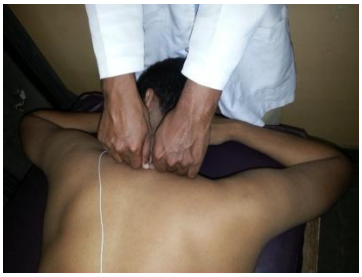


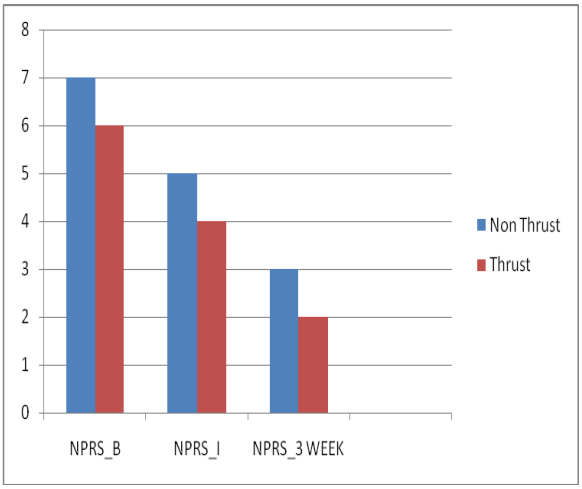
Figure 3: Non-thrust mobilization.

RESULTS

As the data were distributed non normally, non parametric tests of comparison were used where Wilcoxon signed ranks test was done to evaluate within group difference for thrust and non thrust group, Mann Whitney U test to evaluate between group differences of thrust and non thrust. A total of 25 subjects were randomized into two groups of thrust (n=12) and non thrust (n-13). Within group analysis showed significant improvement in all outcomes in both groups. But between groups no significance is found. There is a significant reduction in pain scores in both the groups compared to baseline but between groups there is no significant change in scores (p=.406 at baseline, p=.769 for post first session and p=.195 at third week).

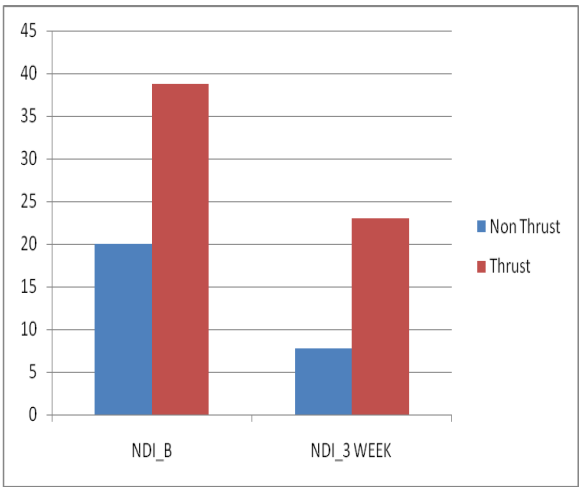
Table 1: Comparison of outcomes between Thrust and Non Thrust groups, Indicating significant difference with p value <0.05.

	Baseline		Post first session		3 Weeks		p
	Median	IQR	Median	IQR	Median	IQR	
NPRS							
Non Thrust	7	6-8	5	3.25-6	3	2-4	.001*
Thrust	6	4.5-6	4	3.5-4	2	1-2	.001*
p value	.406		.769		.195		
NDI							
Non Thrust	20.00	16.5-32.6			7.75	4.5-9.5	.005*
Thrust	38.75	24.8-40.0			23.0	18.12-27.5	.000*
P value	.504				.130		



Graph 1: NPRS at baseline, Post first session and Third week

Within groups NDI showed significant improvement (p=.005 in Non Thrust and p=.000 in Thrust group), whereas between groups there is no significant change p=.504 at baseline and p=.130 at third week.



Graph 2: NDI at baseline and Third week.

Within groups NDI showed significant improvement (p=.005 in Non Thrust and p=.000 in Thrust group), whereas between groups there is no significant change p=.504 at baseline and p=.130 at third week.

Hence from this study it shows that both thrust and non thrust are effective in reducing pain and disability.

DISCUSSION

The objective of the study was to evaluate the efficacy of thrust manipulation and non thrust Mobilization on thoracic spine in mechanical neck pain patient. Results from this study have shown that both thrust and non thrust are effective in reducing pain and disability. Norlander et al, 1998 in his study on the relationship between cervicothoracic junction mobility and mechanical neck pain mentioned that weakness in deep cervical flexors creates a muscular imbalance between superficial cervical flexors and extensors which alters the normal biomechanics of this cervical region and ultimately leading to mechanical neck pain. [7] Maitland proposed guidelines for both these techniques on the basis of which we included mobilizations in Non Thrust group done in prone and Thrust manipulation in supine lying with arms crossed over opposite shoulders. [13] A systematic analysis of pain scales by Gillian A Harker, 2011; suggest that Numerical pain rating scale (NPRS) is more reliable and easy to understand for general population. [18] In our study due to the inclusion of general population NPRS is used instead of VAS outcome measure. After three weeks of intervention there were a total of six dropouts, four from Thrust group and two from Non thrust group and cause for this is due to transportation issues. The results of this study showed a significant change in pain scores (p-0.001) in thrust manipulation group measured by

NPRS with an improvement of two points which is equal to the MCID value pre and immediate after intervention. There was a significant reduction of pain between first week and third week of four points which is more than the MCID for NPRS and our study is consistent with the studies done by Joshua Cleland et al and Harper et al 2005. [19] Lederman 1997 proposed three category mechanism of pain reduction by thrust manipulation, the first one is by improving plasticity and elasticity of the thickened and the shortened tissues, the second by improving fluid biomechanics and the third by pain modulation. [11] This study also showed that there is a greater reduction of disability in both the groups. Participants in thrust manipulation group had a significant reduction of disability with a p value of 0.000 within group from baseline and 3rdweek.This is consistent with the studies done by Joshua Cleland et al, 2007, who used NDI as an outcome measure. [13] Similarly Non thrust mobilisation group had a significant change with a p value of 0.005 which is consistent with the study done by Hoving et al. [20] The common obstacle faced during the study was to convince the subjects to come for intervention efforts were made by phone to remind them of the intervention.

CONCLUSION

There is also a need to develop an evidence based protocol for mechanical neck pain by using manipulation techniques. The present study concluded that both thrust manipulation and non thrust mobilisation are effective interventions in reducing pain and disability in subjects with mechanical neck pain.

REFERENCES

1. Fejer, R., Kyvik, K., & Hartvigsen, H. (2004). The prevalence of neck pain in the world population: a systematic critical review of the literature. Eur Spine J, *15*, 834-848.
2. Bogduk, N. M.S., (1984). Neck pain. Aust Fam Physician, *13*, 26-30.
3. Pearce B. Ergonomic considerations in work-related upper extremity disorders. Clin Occup Environ Med. 2006;5(2):249-66
4. Aaras A, Fostervold KI, Ro O, Thoresen M, Larsen S. Postural load during VDU work: a comparison between various work postures. Ergon. 1997; 40(11):1255-68.
5. Grant R. Physical Therapy of the cervical and Thoracic spine. 3rd edition ed: Churchill Livingstone; 2002. p. 256-8.
6. Ward, R. Foundations for osteopathic medicine 2nd edition, Hagerstown: Lippincott Williams & Wilkins. 2003.
7. Norlander, S., Aste-Norlander, U., Nordgren, B., & Sahlstedt, B. (1996). Mobility in the cervico-thoracic motion segment: An indicative factor of musculo-skeletal neck-shoulder pain. Scand J Rehabil Med Suppl, *28*, 183-192.
8. Kaltenborn F. The Spine: Basic Evaluation of Mobilization Techniques. 2nd edition ed. Olso, Norway1993.
9. Fernández-de-las-Peñas C, P.-d.-C. L., Rodríguez-Blanco C, Gómez-Conesa A & Miangolarra-Page JC. (2007). Changes in neck pain and active range of motion after a single thoracic spine manipulation in subjects presenting with mechanical neck pain: a case series. J Manipulative Physiol Ther, 30, 312-320.
10. Greenman, P. Principles of manual medicine. Philadelphia: Lippincott Williams and Wilkins. 1996
11. Lederman, E. Fundamentals of manual therapy. New York: Churchhill Livingston. 1997
12. Maitland, G., Hengeveld, E., Banks, K., & K, E. Maitland's vertebral manipulation (Vol. 6th ed). London, England Butterworth Heineman. 2000.
13. Vernon H, Humphreys BK, Hagino C. Chronic mechanical neck pain in adults treated with manual therapy: A systematic review of change scores in randomized clinical trials. J Manipulative Physiol Ther 2007;30: 215–227
14. Cleland JA, Childs JD, Whitman JM. Psychometric properties of the neck disability index and numeric pain rating

scale in patients with mechanical neck pain. Arch Phys med Rehabil, 2008 Jan; 89(1): 69-74.

15. Shea BJ, Hamel C, Wells GA, Bouter LM, Kristjansson E, Grimshaw J, et al. AMSTAR is a reliable and valid measurement tool to assess the methodological quality of systematic reviews. J Clin Epidemiol.2009; 62:1013-1020.
16. Fernández, C., Palomeque-del-Cerro, L., Rodríguez-Blanco, C., Gómez-Conesa, A., & Miangolarra-Page, J. C. (2007). Changes in neck pain and active range of motion after a single thoracic spine manipulation in subjects presenting with mechanical neck pain: a case series. J Manipulative Physiol Ther, *30*, 312-320
17. Kanlayanaphotporn R, Chiradejnant A, Vachalathiti R. Immediate effects of the central posteroanterior mobilization technique on pain and range of motion in patients with mechanical neck pain. Disability and Rehabilitation 2010; 32(8):622-8.
18. Gillian A. Harker Samra Mian, Tetyana Kendzerska, AND Melissa French. Measures of Adult Pain. Arthritis Care& *Research*. November 2011; Vol. 63(11):250-251.
19. Cleland J, C. J., McRae M, Plamer J, Stowell T. Immediate effects of thoracic manipulation in patients with neck pain. Man Ther, 2005 10, 127-135.
20. Hoving et al, Manual therapy, physical therapy, or continued care by a general practitioner for patients with neck pain. A randomized, controlled trial. Ann Intern Med, 2002; 136(10):713-22.

How to cite this article: Alagingi NK, Kumar BSP. A comparative study of finding the efficacy of thrust manipulation versus non thrust mobilization on thoracic spine in patients with mechanical neck pain. Int J Health Sci Res. 2018; 8(5):169-174.

****