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Research Article

IMMEDIATE EFFECTS OF TRANSVERSE THORACIC MOBILISATION IN PATIENTS WITH PRIMARY COMPLAINT OF MECHANICAL NECK PAIN

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ABSTRACT

Background-Mobilisation is defined as a manual therapy technique comprising a continuum of skilled passive movement to the joint complex that are applied at varying speeds and amplitudes, that may include a small amplitude/high velocity therapeutic movement(manipulation) with the intent to restore optimal motion, function, or to reduce pain.

Purpose-Purpose of the study is to find out correlation between the cervical and thoracic spine after delivering mobilisation.

Methodology- testing was performed using 3 D motion analyser in which 50 participants were taken(7 male and 43 females) aged between 18 to 30 years were taken and were given Transverse thoracic mobilisation at T_1 and T_2 spinous and transverse process for 1 minute at each side.(unilateral pain).

Result and conclusion- transverse thoracic mobilisation at T_1 T_2 positively shows that there is decrease in neck pain and increase in range of motion at cervical segment. There was Maximum increase in left rotation angle, which was found to be- pre 61.92±13.153 Post 68.76 ±10.101(mean increase angle 6.84) and there was minimum improvement in right side flexion where pre mean angle was 37.84±8.728 and post was 41.24 ±8.893 (mean increase angle 3.4) Pre mean NPRS was 4.58 ±1.416 and post it was 2.02 ±1.421 (mean decreased pain was 2.56).All values were statistically significant at P= <0.001.

INTRODUCTION

Neck pain is a common musculoskeletal complaint with a point prevalence around 15% in males and 23% in female.[1] Cervical spine is a very complex structure. It supports the head allowing precise movement and position.[16] Greater activation of the cervical muscle in patients with neck pain may represent an altered pattern of motor control to compensate for reduced activation of painful muscles.[17] Head and neck region is vulnerable to many different stresses. Bad posture can cause misalignment of head, neck, spine.[17] Mechanical neck pain is a common occurrence in general population with the overall prevalence of neck pain reported as high as 87%.[1]Mechanical neck pain may be defined as generalised neck pain with symptoms provoked by neck postures, neck movement, or palpation of cervical musculature.[7]

Mechanism of Neck Pain

Pain from the neck region is variously described and may originate from various tissue sites within the cervical spine. Pain also produced by numerous mechanism through various pathway. Pain may be felt in various areas of neck region. Recent studies have elucidated which tissue within the cervical spine irritated or inflamed, are capable of eliciting pain. The tissue reaction using the production of nociceptive agents that affects the end organ of the sensory nerve that results in pain.[16] Participant reporting neck pain often seek manual therapy for the management of their symptoms. In fact, physical therapy is generally the first management option for the patients with mechanical neck pain.[1] 2 recent systematic reviews have supported the effectiveness of cervical and thoracic spine thrust manipulation for management of patient with mechanical, insidious neck pain, although further studies are needed.[4]

Mobilisation can be defined as a manual therapy technique comprising a continuum of skilled passive movement to the joint complex that are applied at varying speeds and amplitudes, that may include a small amplitude/high velocity therapeutic movement(manipulation) with the intent to restore optimal motion, function, or to reduce pain.[3]

The technique selected for this study is central and unilateral posterior-to-anterior (PA) pressure.[5] The disturbance in the

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joint mobility in the upper thoracic spine may be an underlying contributor to the musculoskeletal disorders in the cervical spine.[6]

Two recent systemic reviews concluded that individuals with mechanical neck pain benefit from thoracic spine thrust manipulation, however the exact neurophysiologic mechanism by which thoracic manipulation exert its effects remain to be elucidated.[1] Range of motion assessment of cervical spine include flexion and extension in saggital plane, lateral flexion in frontal plane and rotation in transverse plane.[2,10]
Normal ramge of motions-[10]

Flexion=50
Extension=60
Right lateral flexion=45
Left lateral flexion=45
Right rotation=80
Left rotation=80

Studies have reported significant association between decreased mobility in the cervico -thoracic junction and the presence of mechanical neck pain.[6]

The purpose of our study is to find out Immediate effects of transverse thoracic mobilisation in patients with primary complaints of mechanical neck pain.

Factors for Mechanical Neck Pain

- Strain of muscles in the neck.
- Sprain of ligaments.
- Poor posture (i.e., prolonged sitting in a bent forward position.)
- Physical overload.
- Stress.
- Smoking.
- Poor psychological health.

Grades of Movement by G.D Maitland

Grade- 1	**a small amplitude movement at the beginning of range**
Grade-2	A large amplitude movement within the resistance free range
Grade -3	A large amplitude movement into approximately 50% of the resistance considered normal for the structure tested
Grade- 4	A small amplitude movement into approximately 50% of the resistance considered normal for the structure tested
Grade -5	Small amplitude movement at the end of range, performed at such speeds that it is outside the patients control

Need For Study

- Purpose of our study is to find out correlation between thoracic and cervical spine in order to relieve mechanical neck pain.
- To explore the immediate effect of mobilisation in patients with complain of mechanical neck pain.
- Evidence has begin to emerge in support of thoracic spine manipulation as an intervention and management of the mechanical neck pain hence we are doing this study to make a strong recommendation for the same**.**

Aim

To observe the immediate effect of transverse thoracic mobilisation in patient with primary complaints of mechanical neck pain aged between 18-30 years.

Objectives

- To measure the change in range of motion at cervical segment pre and post mobilisation.
- To check the difference in pain intensity pre and post mobilisation.

METHODS

Participants

Our study is experimental study in which Sample size calculation yielded a requirement of 50 participants aged between 18 – 30 years with neck pain of both the genders. Requirement was by convenience sampling from the patients of VSPM's College Of Physiotherapy.

Inclusion criteria for the patients was

1. patient with mechanical neck pain
2. Age - 18 to 30 years
3. Unilateral neck pain
4. Both the genders.
5. Participants with suprascapular pain in addition to neck pain.
6. Symptoms of 1-6 months of duration.

Our exclusion criteria were

1. Whiplash injury
2. Previous spine surgery
3. Diagnosis of cervical radiculopathy or myelopathy
4. Any contraindication to manipulation eg. Malignancy, spondilolisthesis.
5. Symptoms inferior to suprascapular area.
6. The project was approved by Maharastra University Of Health Sciences, Nashik. All the participants were informed that they would receive manipulation at spine and written informed consent was taken before their enrollment.

Outcome Measures

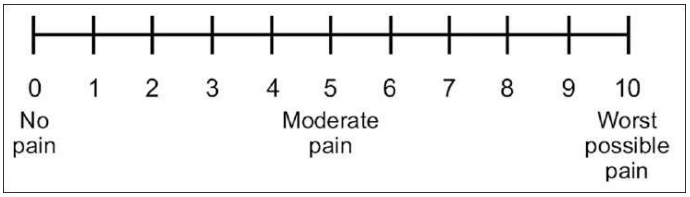
Outcome of interest were active neck motion, and report of pain.

- For Cervical Range Of Motion : 3-D motion analyser was used with 2 sensors-Blue And Green placed at T_1 spinous process and at forehead respectively. To measure flexion, extension, lateral flexion(right and left), rotation(right and left) with the participant seated.
- Pain intensity was measured via 10 point- Numerical Pain Rating Scale, where participants were asked to circled the number from 0='no pain' to 10='worst possible pain' that best described their pain pre and post mobilisation.

Materials Used

Stop Watch: To keep watch on time.

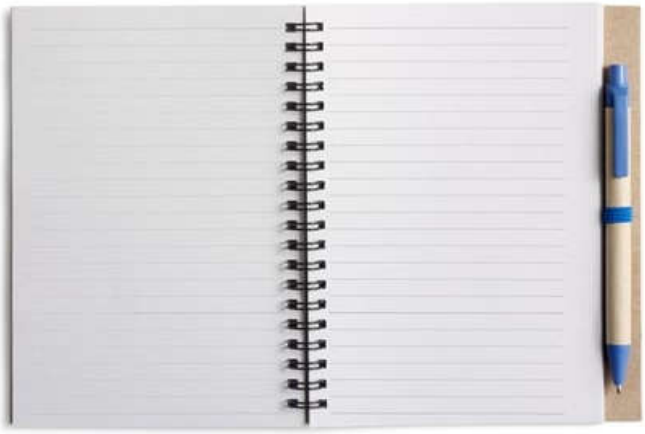
Numerical Pain Rating Scale: A 11 point numerical pain rating scale is used to measure the pain intensity, where 0=no pain and 10=worst possible pain.[4]



3-D Motion Analyser: To measure the cervical range of motion.

Mobilisation Bed: To administer the treatment protocol.

Notepad and Pen: for documentation of the findings.



Procedure

Permission to carry out the study was first obtained from the Director of VSPM's College Of Physiotherapy, refer (Annexure I). After obtaining the permission, the research proposal was forwarded to the ethical committee and permission was obtained from the institution's ethical committee. This was later followed by selecting participants fulfilling inclusion criteria.

The subject were selected from VSPM's College of Physiotherapy. They were both males and females as per inclusion criteria. The subjects were selected as per our convenience.

The participants were then explained with regards to nature of the study and after describing them with procedure, the written consent was obtained from them, refer (Annexure II). Later the participants were interviewed with self reported demographic data, refer (Annexure III).

The responses received from the participants were then marked in the assessment form which formed the primary data of the study.

The data obtained and then tabulated in the master chart, refer (Annexure IV) which was later statistically analysed.

Saggital view of hand placement for transverse thoracic mobilisation over spinous process

Saggital view of hand placement for transverse thoracic mobilisation over spinous process

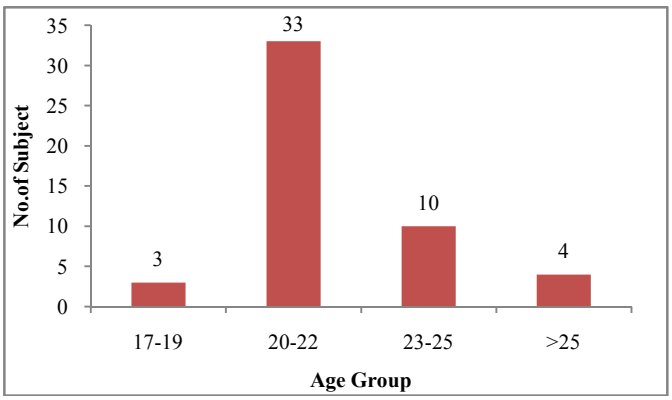
Posterior view of hand placement for transverse thoracic mobilisation at spinous process

Range of Motion through Motion Analyser

Study Protocol

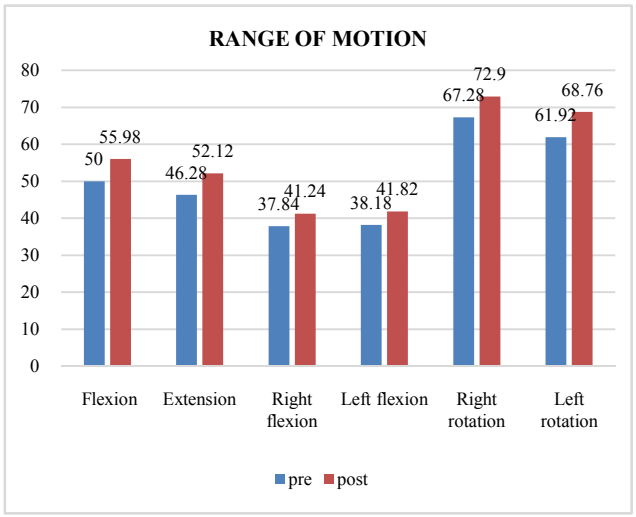
After selecting patients as per our selection criteria Range of motion and NPRS scores were taken. Then the patients were treated with non-thrust transverse vertebral pressure as described by Maitland[6]. The patient lay prone with the arms to the side and forehead neutral resting on forearm. Mobilisation was then applied to T_1 spinous process which was identified by first locating C_6 vetebrae using cervical extension method, and then counting caudally. The therapist stood at head end of the patient and pad of thumb was placed at spinous process of T_1 vertebrae at 90 degree angle from the shoulders. Pressure was applied to the spinous process to produce small amplitude, low velocity oscillations into resistant range of vertebrae(Grade IV). This procedure was performed for 30 seconds, then sequentially applied to transverse process of T_1 vertebrae and then to spinous and transverse process of T_2 vertebrae. Only unilateral (painful side) transverse process were mobilised.

DATA ANALYSIS AND RESULT



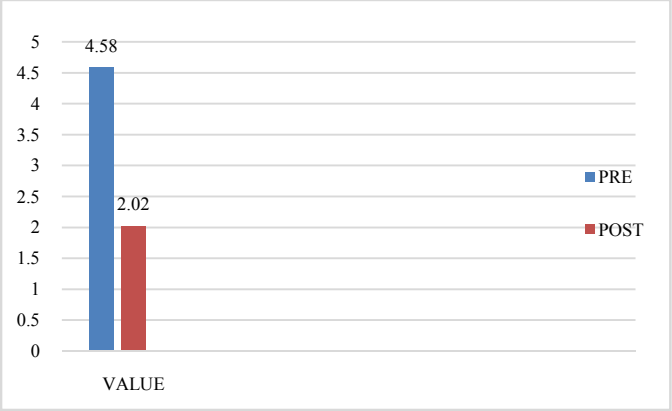
MEAN AGE=22.40 ± 2.89

AGE		
Age Group	**Frequency**	**Percent**
17-19	3	6.0
20-22	33	66.0
23-25	10	20.0
>25	4	8.0
Total	50	100.0
Mean Age + S.D.		22.40±2.89



Ranges	pre	post	mean
Flexion	50	55.98	5.98
Extension	46.28	52.12	5.84
Right side flexion	37.84	41.24	3.4
Left side flexion	38.18	41.82	3.64
Right rotation	67.28	72.9	5.62
Left rotation	61.92	68.76	6.84

Significant improvement in all range of motion. With maximum increase in left rotation.



NPRS	PRE	POST
VALUE	4.58	2.02

Significant reduction in pain intensity mean decreased pain was 2.56.

Age:
Mean age = 22.40 ± 2.89
Range of motion:

There was Maximum increase in left rotation angle, which was found to be- pre 61.92±13.153 Post 68.76 ±10.101(mean increase angle 6.84) and there was minimum improvement in right side flexion where pre mean angle was 37.84±8.728 and post was 41.24 ±8.893 (mean increase angle 3.4)

NPRS:

Pre mean NPRS was 4.58 ±1.416 and post it was 2.02 ±1.421 (mean decreased pain was 2.56)

All values were statistically significant at P= <0.001

DISCUSSION

Cervical pain is one of the commonest cause for a person visiting physiotherapy OPD. Even though there are many cause for neck pain, but bad posture, Strain of muscles in the neck, Sprain of ligaments and Physical overload can be causes for mechanical neck pain. In our study the cervical range of motion and pain intensity were evaluated in patient population and age matched normal volunteer.

In our study of 50 participants. The male female ratio in intervention group was 7:43.

The mean age of participants came to be 22.50(±2.89).
The mean range of motion at cervical flexor, extensors, side flexors, rotators were measured in neutral position.

The mean range of flexion was pre 50.00 to post 55.98, extensor range was pre 46.28 to post 52.12, left side flexion was pre 38.18 to post 41.82, right side flexion was pre 37.84 to post 41.24, left rotation pre 61.92 post 68.78, right rotation was pre 67.28 to post 72.90.

The mean NPRS score was pre 4.58(±1.416) and post 2.02(±1.421).

80 % of patients with mechanical neck pain showed significant decrease in NPRS score after delivering transverse thoracic mobilisation.

Statistical analysis was done using unpaired T- test. According to this analysis the mean range of motion in the intervention group shows highly significant P- value(<0.001) in all the range of motion. The mean pain intensity also had a significant P- value(<0.001).

Mobilisation has shown maximum improvement in-
Left rotation followed by flexion then extension then right rotation then left flexion and lastly right flexion with minimum improvement.

Mobilisation force introduced at thoracic spine produced simultaneous, inadvertent rotation of the cervical segment.
After delivering grade IV mobilisation, there occurred reduction in NPRS scores as cervical pain was thoracic in origin.

Rational for giving mobilisation at thoracic vertebrae:

1. Region provided a pragmatic alternative to direct contact with cervical spine.
2. Deepest layer of neck muscle links cervical and thoracic segments. (Rectus capitis posterior major and minor, obliqus capitis superior and inferior.)
3. Cervical and thoracic segments are co-related by uncinated process.
4. Nociceptive input from the cervical spine produces palpable musculoskeletal changes in upper thoracic spinal segment.
5. Central descending inhibitory pain pathway may be possible explanation for immediate hypoalgesic effect following manipulation.

Changes in deep cervical flexors motor performance

High velocity displacement of vertebrae may alter afferent discharge rate by stimulating mechanoreceptors in zygapophyseal joint capsule, spinal ligament, intervertebral disc and proprioceptors in muscle spindles and GTO, there by changing alpha motor neuron excitability levels and subsequent muscle activity.

Fernandez-de-las-penas C and Cleland JA, reported that thoracic spine manipulation can result in improvement in pain and cervical range of motion, in a patient population with mechanical neck pain and our study strongly supports the same.

Study by Raquel Martinez Segura, Ana Isabel De-La Llave Rincon, Ricardo Ortega Santiago, Joshua Cleland. Immediate changes in widespread pressure pain sensitivity, neck pain, and cervical range of motion after cervical or thoracic thrust manipulation n patients with bilateral chronic mechanical neck pain: a randomize clinical trial, suggest that cervical and thoracic spine thrust manipulation induce similar changes in PPT, neck pain intensity, and cervical range of motion in individuals with bilateral chronic mechanical neck pain.

Our mother article- Clndy Mc Gregor, Robert Boyles, Laura Murahashi, Tanya Sena, Robert Yarnall. The immediate effects of thoracic transverse mobilisation in patients with primary complaints of mechanical neck pain: a pilot study concluded that after performing non thrust mobilisation technique to the upper thoracic spine, a significant increase in cervical extension and bilateral rotation and a clinically meaningful decrease in neck pain were noted which can be supported positively by our study.

SUMMARY AND CONCLUSION

Our study of 50 patients aged between 18 – 30 years positively shows that there is decrease in neck pain and increase in range of motion at cervical segment after transverse thoracic mobilisation.

Statistical analysis was done using unpaired T- test. According to this analysis the mean range of motion in the intervention group shows highly significant P- value (<0.001) in all the range of motion. The mean pain intensity also had a significant P- value(<0.001).

So, we can conclude that transverse thoracic mobilisation may be appropriate to incorporate in treatment plan for patient with primary complaint of mechanical neck pain.

Clinical Implication

Transverse thoracic mobilisation exerts a modulating effect on the central nervous system for the management of upper quadrant pain syndrome, therefore, the clinicians need to be aware of this.

Limitations

1. We restricted our self in this study to the immediate effects of transverse thoracic mobilisation in patients with mechanical neck pain and it does not include any further follow up sessions and therefore we cannot comment on its long term effect.
2. We did not included control group, which limits the interpretation of our data.
3. Only one treatment session was used and hence inferences regarding multiple treatment sessions cannot be made.

Future Scope

Future study should include multiple treatment session along with a longer-term follow- up.
Future study should include a control/placebo group to avoid any limitation.

BIBLOGRAPHY

1. Raquel Martinez Segura, Ana Isabel De-La Llave Rincon, Ricardo Ortega Santiago, Joshua Cleland. Immediate changes in widespread pressure pain sensitivity, neck pain, and cervical range of motion after cervical or thoracic thrust manipulation n patients with bilateral chronic mechanical neck pain: a randomize clinical trial.
2. Chantal H.P. De Koning, Sylvia P. Van den Heuvel, J. Bart Staal, Erik J.M. Hendriks. Clinimetric evaluation of active range of motion measures in patients with non – specific neck pain: a systematic review
3. Mintken PE, *et al*. A, model for standardising manipulation terminology in physical therapy practice, J orthop sports phys Ther 2008; A1-A6.
4. John T. Farrar, James P. Young Jr., Linda LaMoreaux, John L. Werth, R. Michael Poole. Clinical importance of changes in chronic pain intensity measured on a 11-point numerical pain rating scale.
5. Scott Haldeman, Linda Carroll, David Cassidy, Jon Schubert, Ake Nygren. The bone and joint decade 2000-2010 task force on neck pain and its associated disorder.
6. James R. Dunning, Joshua Cleland, Mark A. Waldrop, Cathy Arnot, Ian Young, Michael Turner, Gisli Sigurdsson. Upper cervical and upper thoracic thrust manipulation versus non thrust manipulation in patients with mechanical neck pain: a multicenter randomized clinical trial.
7. Ana Isabel de-la-Llave-Rincon, Emilio J Puentedura, Cesar Fernandez-de-las Penas. Clinical presentation and manual therapy for upper quadrant musculoskeletal conditions.
8. Cassidy JD, Lopes AA, Yong-Hing K. The immediate effect of manipulation versus mobilization on pain and range of motion in the cervical spine: a randomized controlled trial. *J Manipulative Physiol Ther. 1992; 15:570-575.* Javier Gonzalez Lglesias, Cesar Fernandez De-Las-Penas, Joshua Cleland, Maria del Rosario Gutierrez-Vega. Thoracic spine manipulation for the management of patients with neck pain: a randomized clinical trial.
9. Clndy Mc Gregor, Robert Boyles, Laura Murahashi, Tanya Sena, Robert Yarnall. The immediate effects of thoracic transverse mobilisation in patients with primary complaints of mechanical neck pain: a pilot study.
10. Cynthia Norkins. Measurement of joint ranges.
11. G.D. Maitland. Vertebral manipulation 5th edition.
12. Jaime salmon-moreno, Ricardo ortega-Santiago, Joshua Aland Cleland, Sebastian Truyols-Domingues. Immediate changes in neck pain intensity and widespread pressure pain sensitivity in patients with bilateral chronic mechanical neck pain: a randomised controlled trial of thoracic thrust manipulation vs. Non thrust manipulation.
13. Suzanne J Snodgrass, Joshuda Cleland, Darren A Rivett, Robin Haskins. The clinical utility of cervical range of motion in diagnosis, prognosis, and evaluating the effects of manipulation: a systematic review.
14. orthopaedic interventions :mobilisation of the nerves and Joints of extremities. Everett. B.Lohman III
15. *Journal of manipulative and physiological therapeutics* 1990; 13:13-16. from the Canadian memorial chiropractic college, Toronto, Canada.
16. Rene cailliet:neck and arm pain; pain series; third edition;1999
17. What you need to know about your neck pain: *journal of American physical therapy association*; 1996

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