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RESEARCH ARTICLE

CERVICOTHORACIC THRUST MANIPULATION IN AN ACUTE PAINFUL SHOULDER – A CASE REPORT

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Abstract

Purpose: The purpose of this case study was to determine whether cervicothoracic osteopathic thrust manipulation can improve a patient with shoulder pain and restriction.
Case: This is a case of 35-year autorickshaw driver who complained an acute onset of shoulder pain and restriction. The therapist had several differential diagnoses according to the patient's findings, however, since the cervical spine accessory movement findings were significantly associated with the patient's complaints, wet ried a cervicothoracic-directed thrust manipulation. And we noticed an immediate improvement in the patient's symptoms following the manipulation procedure.
Outcomes: The pain perception improved 4 point in10-point Numeric pain rating scale. Similarly, there were 60 degrees and 90-degree improvements in the active flexion and abduction range respectively immediately following the intervention.
Conclusion: This case study concludes that a spinal thrust manipulation targeted at the cervicothoracic region can immediately alleviate shoulder pain and discomfort.

Introduction:-

Shoulder pain is said to be the most frequent musculoskeletal condition after spinal pain. There is proof that shoulder pain is frequently persistent and recurrent. In order to better targeted treatment and prognosis, as well as epidemiological studies, it is critical to accurately differentiate between shoulder and cervical illnesses that cause shoulder pain. 1,2

The inability to move one's shoulder freely as a result of discomfort, stiffness, or weakness can result in a significant degree of disability and impact one's capacity to engage in normal activities. Shoulder discomfort is the third most prevalent cause of musculoskeletal complaints and has a prevalence that is believed to range from 16 to 26 percent among people who have reported experiencing it themselves. Shoulder problems are more likely to occur in people who work certain jobs because of the physical demands of those jobs, which can include carrying large loads, performing repeated motions in awkward positions, and lifting heavy weights. 2,3

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An elevated incidence of new-onset shoulder pain has been linked to mechanical factors such job load, posture, and repeated movements. In healthcare settings, patients with shoulder pain are frequently met. Various diagnostic designations, such as tendinitis, bursitis, rotator cuff strain, and impingement syndrome, have traditionally been used to describe these patients. 2,3,4 The pathophysiology behind shoulder diseases is still up for debate, though, as the diagnostic tests' reliability is questionable and their diagnostic validity is generally only fair. Not all shoulder discomfort can be categorized with a distinct pathoanatomical diagnosis, despite the fact that these diagnoses were derived using a pathophysiological model. The categorization and treatment of pain with non-specific spinal origins have previously been successful attempts at employing non-specific classification systems, derived by sub-grouping patients based on specified criteria.5,6

Spinal manipulation (SM) is a common technique for treatment of neck pain and has demonstrated various mechanical, neurophysiologic, and analgesic effects. Spinal Manipulation is used by physical therapists and other healthcare practitioners as an intervention to help relieve spinal pain and reduce disability. Spinal Manipulation has been shown to be an effective intervention for patients with non-specific mechanical neck pain (NS-MNP), either alone or in combination with exercises as part of a multimodal management strategy. According to a recent study, the mechanical stimulus created by cervical manipulation appears to outweigh nociceptive signals. 7,8,9

Because of the well-known negative consequences of prescription opioids, drug-free treatments like spinal manipulation might be a good option for people who are in pain. Our aim was to examine the immediate effects of cervical spinal manipulation (CSM) in changing pain perception and improving the range of motion in painful and restricted shoulders taking into consideration the aforementioned findings. We hypothesized that the mechanical stimuli initiated by a CSM would result in positive changes in shoulder pain and restriction.

Assessment & case presentation

A 35-year-old auto-rickshaw driver presented to the outpatient physiotherapy department complaining of shoulder and arm pain as well as difficulty moving the right shoulder. Before this commencement, he was apparently fine the previous night; but, upon arising in the early morning, he noticed pain around his shoulder and upper arm, as well as restricted movement in his right shoulder. Normal chores, such as showering and donning the vests, posed difficulties for him. No complaints of neurological involvement were received. He has no past medical history related to his current symptoms. Likewise, the patient was devoid of any underlying comorbidities. On observation, there was a gothic shoulder on the right, and there was a flattening of space between the medial scapular border and spinous processes. The neck was slightly tilted to the affected side and tenderness was present around the nope and right shoulder. On active movement examination, the therapist noticed that the quality of movements for the flexion and abduction directions was poor. While examining the passive movement all the above movements were restricted due to an empty end feel. In addition, the examiner found a hypomobile and painful lower cervical spine segments especially, on C7, and T1.

The therapist hypothesized several differential diagnoses based on the foregoing characteristics, including rotator cuff disorder, pain due to the cervical pathology, myofascial pain syndrome, discogenic symptoms, etc.

In accordance with the listed differential diagnosis, the therapist conducted a number of diagnostic special tests. All of the special tests for the four rotator cuff muscles were used to detect rotator cuff pathology. Both the empty can test and the full can test were carried out for the supraspinatus. Similar exercises for the infraspinatus and subscapularis muscles included the infraspinatus stress test and the belly press test. The patient was unable to complete the remaining tests, including the Teres Minor Special Test. Surprisingly, none of the other tests—aside from the one with the empty can—exhibited favorable results. (table 1). As the special test was having high sensitivity we could not rely on the findings of only one special test. 10,11

To rule out cervical pathology the examiner assessed the accessory movement testing of cervical spine and found a hypomobile and painful lower cervical spine segments especially, on C7, and T1. The C7 was more painful and stiffer than the other segments.

We attempted to manipulate the hypomobile C7-T1 segment because the patient had a painful and stiff cervical segment. The ROM increased, while it was still not complete ROM, when I tried to mobilize the junction of C7 and T1 and urged the patient to perform active shoulder motions. The CT junction was then manipulated. After

manipulating the CT junction, it was found that the shoulder's range of motion (ROM) was complete without experiencing any pain, however, the patient had reported experiencing some soreness.

Intervention and outcome measures Manipulative Procedure

The patient is instructed to lay face down on the plinth with both arms hanging by the side. The patient is asked to rotate the neck and look to the opposite side which is going to be manipulated. Then the therapist on hand (hypothenar eminence) is kept on the junction of C7 and T1 and the other hand is kept on the cephalad. Then the cephalad hand applies rotation and extension of the neck and at the same time, the other hand applies a thrust to C7 and T1 junction directing the thrust towards the axilla of the opposite side (figure 1).

Following the manipulation procedure, the therapist prescribed hot fermentation to alleviate the sorenesss around the shoulder and upper arm. Chin tuck (cervical protrusion / retrusion) and thoracic extension exercises, two types of postural correction exercises, were also recommended to increase mobility in the cervical spine and upper back. 8,9

The outcome measures were assessed at the baseline, post treatment day-1, day-7 & the follow-up was taken at one month post-treatment.

The primary outcome measure pain was assed using 10-point Numeric Pain Rating Scale (NPRS). Similarly, the secondary outcome measures the range of motions (ROM) were assessed using mobile clinometer, and the global rating of outcomes (GROC) was assessed to evaluate the perception level following the treatment. 12,13,14,15 Verbal and written consent was obtained from the patient prior to the above procedures.

Outcomes

All the outcomes were improved significantly immediately following the first session and there was no recurrence of the symptoms at the one-week post and at the one-month follow-up as well (Table 2).

There was a 4 point reduction of pain perception from 6 to 2 in a 10 point NPRS scale immediately following the first session. Similarly, the active range of motions also significantly improved around 60 degree and 90 degree for flexion and abduction range respectively following the first session. The global rating of outcome score also had positive scores at the end of first session. And there were no adverse effects reported following these sessions.

Table 1:- Diagnostic test outcomes.

SPECIAL TESTS	**FINDING S**
Empty can test	Positive
Full can test	Negative
Belly press test	Negative
Lift-off sign	NA
Infraspinatus test	Negative
Teres minor test	NA

Table 2:- Outcome measures.

Outcomes	**Baseline**	**1st session**	**Day7**	**1month/ followup**
NPRS	6	2	0	0
AROM flexion (degree)	40	100	150	170
AROM abduction (degree)	30	120	160	170
GROC	NA	5	6	7
NPRS - Numeric Pain Rating Scale **AROM-** Active Range of Motion **GROC-** Global Rating of Outcomes				

Figure 1:- Manipulative technique.

Discussion:-

The purpose of this study was to investigate the effect of cervicothoracic thrust manipulation on mechanical shoulder pain. The results demonstrated a significant and beneficial increase in the treatment outcomes following thrust manipulation.

The results of the present investigation are highly similar to previous data. 12,14,15,16 The stimulation of joint mechanoreceptors is one element that could have caused this. Both therapies applied pressure and hand touch to the upper thoracic region, possibly stimulating the Golgi-Mazzoni corpuscles and Pacini's corpuscles pressure mechanoreceptors, which are responsible for this stimulation. 14,15 These receptors have a propensity to follow the spinal cord, carrying mechanical deformation information that is decoded in the bulb, thalamus, and sensory cortex. In general, hand stimulation tends to induce body relaxation, which may have helped to alleviate the unpleasant complaint and subsequently increase shoulder range of motion. 16

Another possible explanation for the improvements is an increase in serum concentrations of neurotensin, oxytocin, and cortisol after the manipulation technique. Antinociceptive effects of oxytocin, neurotensin, and orexin have been well established, while the endocrine-related steroid hormone cortisol plays a role in analgesia as it pertains to the stress response as well as immunological characteristics linked with the inflammatory process.15,17

Immediate hypoalgesic effects have been reported following HVLA thrust manipulation, and several possible explanations for these effects have been proposed. These explanations include biomechanical, spinal or segmental, and central descending inhibitory pain pathway theories. 17,18

The therapist uses accessory movement testing to diagnose the patient because it was favorably correlated with the symptoms. We did not depend heavily on the special tests because they were all provocative in character and lacked diagnostic accuracy. The examiner also proposed that muscular guarding might be the cause of the discomfort and tightness in the shoulder and upper arm region. And following the manipulation, the guarding might have been reduced. 18

The authors suggest establishing a clinical prediction model for the same purpose as well as conducting research into the effect of cervicothoracic thrust manipulation on a bigger scale with a subgroup of people who suffer from neck and arm pain.

Conclusion:-

According to the findings of the current case study, one may draw the conclusion that cervicothoracic thrust manipulation has effects on shoulder discomfort and range of motion-related disabilities that are both immediate and short term.

References:-

1. Tsvetkova, V., & Prakova, G. (2021, November 18). MUSCULOSKELETAL DISORDERS AND ASSOCIATED WORKPLACE RISK FACTORS IN HIGHER EDUCATION
2. EMPLOYEES. Journal of IMAB - Annual Proceeding (Scientific Papers), 27(4), 4108–4112. https://doi.org/10.5272/jimab.2021274.4108
3. Rodriguez Diez-Caballero, B., Alfonso-Beltrán, J., Bautista, I.J. et al. Occupational risk factors for shoulder chronic tendinous pathology in the Spanish automotive manufacturing sector: a case-control study. BMC Musculoskelet Disord 21, 818 (2020). https://doi.org/10.1186/s12891-020-03801-5
4. Aldon-Villegas, R., Ridao-Fernández, C., Torres-Enamorado, D., & Chamorro-Moriana, G. (2021b, May 8). How to Assess Shoulder Functionality: A Systematic Review of Existing
5. Validated Outcome Measures. Diagnostics, 11(5), 845.
6. https://doi.org/10.3390/diagnostics11050845
7. Budtz, C.R., Mose, S. & Christiansen, D.H. Socio-demographic, clinical and psychological predictors of healthcare utilization among patients with musculoskeletal disorders: a prospective cohort study. BMC Health Serv Res 20, 239 (2020). https://doi.org/10.1186/s12913-020-05100-0
8. Yasmaine H.J.M. Karel, Arianne P. Verhagen, Marloes Thoomes-de Graaf, Edwin Duijn, Maaike P.J. van den Borne, Annechien Beumer, Ramon P.G. Ottenheijm, Geert-Jan J. Dinant, Bart W. Koes, Gwendolijne G.M. Scholten-Peeters, Development of a Prognostic Model for Patients With Shoulder Complaints in Physical Therapist Practice, Physical Therapy, Volume 97, Issue 1, January 2017, Pages 72 80, https://doi.org/10.2522/ptj.20150649
9. Pieter F van Doorn, Evelien I T de Schepper, Rianne M Rozendaal, Ramon P G Ottenheijm, Johan van der Lei, Patrick J Bindels, Dieuwke Schiphof, The incidence and management of shoulder complaints in general practice: a retrospective cohort study, Family Practice, Volume 38, Issue 5, October 2021, Pages 582–588, https://doi.org/10.1093/fampra/cmab022
10. Kovanur-Sampath K, Mani R, Cotter J, Gisselman AS, Tumilty S. Changes in biochemical markers following spinal manipulation-a systematic review and meta-analysis. Musculoskelet Sci Pract. 2017 Jun;29:120-131. doi: 10.1016/j.msksp.2017.04.004. Epub 2017 Apr 5. PMID: 28399479.
11. Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, Haines T, Brønfort G, Hoving JL. Manipulation or mobilisation for neck pain: a Cochrane Review. Manual therapy. 2010 Aug 1;15(4):315-33.
12. Bronfort G, Haas M, Evans R, Leininger B, Triano J. Effectiveness of manual therapies: the UK evidence report. Chiropractic & osteopathy. 2010 Dec;18(1):1-33.
13. Hughes PC, Taylor NF, Green RA. Most clinical tests cannot accurately diagnose rotator cuff pathology: a systematic review. Australian Journal of Physiotherapy. 2008 Jan 1;54(3):159-70.
14. Lafrance S, Charron M, Roy JS, Dyer JO, Frémont P, Dionne CE, MacDermid JC, Tousignant M, Rochette A, Doiron-Cadrin P, Lowry V. Diagnosing, Managing and Supporting Return to Work of Adults with Rotator Cuff Disorders: A Clinical Practice Guideline. Journal of Orthopaedic & Sports Physical Therapy. 2022 Jul 27(0):1-37.
15. Silva, A. C. D., Santos, G. M., Marques, C. M. D. G., & Marques, J. L. B. (2019, March). Immediate Effects of Spinal Manipulation on Shoulder Motion Range and Pain in Individuals With Shoulder Pain: A Randomised Trial. Journal of Chiropractic Medicine, 18(1), 19–26. https://doi.org/10.1016/j.jcm.2018.10.001
16. Dash NP, Deepak Kumar Pradhan A. Immediate effect of mobilisation vs myofascial release on pain and range of motion in patients with shoulder impingement syndrome: a pilot randomized trial. Indian Journal of Physiotherapy & Occupational Therapy. 2020 Apr 25;14(2):112-7.
17. Dunning, J., Mourad, F., Giovannico, G., Maselli, F., Perreault, T., & Fernández-de-las-Peñas,
18. C. (2015, July). Changes in Shoulder Pain and Disability After Thrust Manipulation in Subjects Presenting With Second and Third Rib Syndrome. Journal of Manipulative and Physiological Therapeutics, 38(6), 382–394. https://doi.org/10.1016/j.jmpt.2015.06.008.
19. Vining, R. D., Long, C. R., Hawk, C., & de Luca, K. (2017, January 4). A systematic review of thrust manipulation for non-surgical shoulder conditions. Chiropractic &Amp; Manual Therapies, 25(1). https://doi.org/10.1186/s12998-016-0133-8.

20. May, S. (2013, August). Shoulder pain: Differential diagnosis with mechanical diagnosis and therapy extremity assessment – A case report. Manual Therapy, 18(4), 354–357. https://doi.org/10.1016/j.math.2012.06.011
21. Hegedus EJ, Goode A, Butler RJ, et al. The neurophysiological effects of a single session of spinal joint mobilization: does the effect last? J Man Manip Ther. 2011;19(3):143–151.
22. Wynne-Jones G, Myers H, Hall A, et al. Predicting pain and function outcomes in people consulting with shoulder pain: the PANDA-S clinical cohort and qualitative study protocol. BMJ Open 2021;11:e052758. https://doi:10.1136/ bmjopen-2021-052758.