COMPARATIVE EFFICACY OF MANUAL THERAPY AND EXERCISE-BASED PHYSIOTHERAPY IN CERVICAL PAIN MANAGEMENT

Aprajeeta Chouhan[1], Prof Dr Bhanwar Singh Takhar[2]

PhD. Research Schooler[1], Professor[2]

[1,2]School of Basic and Applied science, University of Technology, Vatika, Jaipur

Introduction

According to the Global Burden of Disease research, cervical discomfort, often known as neck pain, is one of the most common musculoskeletal problems that people worldwide experience. It frequently ranks fourth in terms of disability-adjusted life years (DALYs) [1] It is a major socioeconomic and personal hardship that affects both industrialized and developing countries. An estimated 70% of people will at some point in their lives have neck pain, and chronic cases (lasting longer than three months) can seriously hinder everyday activities, quality of life, and productivity at work [2]. Myofascial trigger points, facet joint dysfunctions, mechanical instability, postural abnormalities, and degenerative disc degeneration are some of the causes of neck pain [3]. Numerous physiotherapeutic techniques have been used over time to treat cervical spine dysfunctions. Among these, manual therapy and exercise-based rehabilitation have become essential conservative treatment approaches. However, the relative effectiveness of these two modalities has long been disputed by researchers and doctors, which has led to an increase in interest in comparative trials to determine the best course of treatment [4]. A variety of hands-on methods, such as joint mobilizations, manipulations, soft tissue mobilization, trigger point therapy, and muscle energy procedures, are included in manual therapy. These therapies seek to decrease muscle tone, increase range of motion, improve joint mechanics, and control pain through neurophysiological mechanisms[5]. Particularly in cases that are acute or subacute, the use of manual therapy for cervical discomfort has demonstrated encouraging outcomes. Research has indicated that manual therapy can have immediate hypoalgesic effects by enhancing cervical spine movement, proprioception, and descending inhibitory circuit stimulation [6]. Maitland

mobilization is a popular manual treatment technique for cervical dysfunction that applies graduated oscillatory movements to hypomobile joints. Mulligan's mobilization with movement (MWM) is another well-liked strategy that aims to alleviate pain and rectify postural errors by combining active patient movement with accessory joint glides [7]. Although contentious in the cervical region because to worries about the vertebral arteries, skilled doctors occasionally use high-velocity low-amplitude (HVLA) thrust procedures for particular purposes [8]. According to data from several systematic reviews and meta-analyses, manual therapy can lessen the severity of pain, promote neck function, and increase patient satisfaction when applied properly [9]. Conversely, exercise-based physiotherapy places a strong emphasis on encouraging patients to actively participate through planned movement routines. These consist of posture correction exercises, proprioceptive training to enhance neuromuscular control, strengthening regimens for the deep cervical flexors and scapular stabilizers, and stretching activities to ease muscle tension[10]. The use of cervical stability exercises is becoming more and more supported by research, especially for patients who have persistent mechanical neck pain. These exercises are designed to build endurance, rectify improper movement patterns, and rebalance the deep and superficial neck muscles [11]. Exercise treatment encourages self-management, lowers recurrence rates, and fosters long-term patient participation when compared to passive approaches [12]. Exercises for motor control, isometric strengthening, and progressive resistance have all been demonstrated to improve cervical function and lessen handicap brought on by pain. Furthermore, a biopsychosocial approach incorporated into exercise programs targets psychosocial factors including kinesiophobia and fear-avoidance behavior in addition to physical impairments[13] Although manual therapy and exercise-based therapies have their own advantages, comparative studies show conflicting outcomes. According to some research, exercise treatment guarantees long-term, maintained results, whereas manual therapy provides quicker, short-term pain alleviation [14]. Others argue that a combination strategy could be better, but because patient populations, intervention methods, and outcome metrics vary, it is difficult to draw firm conclusions [15]. To address this clinical ambiguity, a randomized controlled trial (RCT) design offers a high degree of evidence. It minimizes biases and establishes causal links by enabling the comparison of interventions under controlled conditions. Finding the modality or combination of them—that provides the most benefit in terms of pain alleviation, functional enhancement, and

quality of life for patients with mechanical cervical pain is especially important [16]. This study compares and assesses how well exercise-based physiotherapy and manual therapy work to improve functional results and lessen cervical pain. Determining which strategy works best will improve treatment plans and maximize patient recovery.

Literature Review

Cleland,etal.(2005).

The use of thoracic spine thrust manipulation to improve pain and disability in patients with mechanical neck pain: A randomized clinical trial. Manual Therapy, 10(2), 127–135. https://doi.org/10.1016/j.math.2004.08.004

Ylinen, et al. (2003).

Active neck muscle training in the treatment of chronic neck pain in women: A randomized controlled trial. JAMA, 289(19), 2509–2516. https://doi.org/10.1001/jama.289.19.2509

Bronfort, et al. (2012). Spinal manipulation, medication, or home exercise with advice for acute and subacute neck pain: A randomized trial. Annals of Internal Medicine, 156(1), 1–10. https://doi.org/10.7326/0003-4819-156-1-201201030-00002

Gross, et al. (2015). Manipulation and mobilization for neck pain contrasted against an inactive control or another active treatment. Cochrane Database of Systematic Reviews, 2015(9), CD004249. https://doi.org/10.1002/14651858.CD004249.pub4

Kay, et al. (2012). *Exercises for mechanical neck disorders. Cochrane Database of Systematic Reviews, 2012*(8), CD004250. https://doi.org/10.1002/14651858.CD004250.pub4

Miller, et al. (2010). *Manual therapy and exercise for neck pain: A systematic review. Manual Therapy, 15*(4), 334–354. https://doi.org/10.1016/j.math.2010.03.009

Leaver, et al. (2010). The efficacy of neck manipulation, medication, and home exercise for treating acute neck pain: A randomized trial. Annals of Internal Medicine, 156(1), 1–10. https://doi.org/10.7326/0003-4819-156-1-201201030-00002

Bialosky, et al. (2009). *The mechanisms of manual therapy in the treatment of musculoskeletal pain: A comprehensive model. Manual Therapy, 14*(5), 531–538. https://doi.org/10.1016/j.math.2008.09.001

Blanpied, et al. (2017). Neck pain: Revision 2017. Clinical Practice Guidelines linked to the International Classification of Functioning, Disability and Health. Journal of Orthopaedic & Sports Physical Therapy, 47(7), A1–A83. https://doi.org/10.2519/jospt.2017.0302

Saavedra-Hernández, et al. (2012). The effectiveness of manual therapy on pain, physical function, and quality of life in patients with chronic non-specific neck pain: A systematic review. Manual Therapy, 17(6), 531–538. https://doi.org/10.1016/j.math.2012.05.009

Research Methodology

Study Design: A comparative study divided into two groups, group A and group B.

Participants

The outpatient department of Madhav Physiotherapy College and Hospital was used to recruit 50 patients with cervical Pain. Clinical presentation and magnetic resonance imaging (MRI) results supported the diagnosis. Inclusion criteria adults in the 25–40 age range. experiencing subacute, or non-specific, cervical pain for four weeks to three months. minimum Neck Disability Index (NDI) score of 20%. In the last three months, there has been no previous physiotherapy treatment for neck pain. capable of engaging in manual therapy and exercise-based therapies and in a stable medical state. Exclusion criteria Radiating pain or signs of cervical myelopathy or radiculopathy are present. history of cervical spine injuries, fractures, or operations. Identification of systemic illnesses that impact musculoskeletal function or inflammatory joint diseases, such as rheumatoid arthritis. neurological impairments present, such as upper limb numbness, tingling, or muscular weakness. undergoing neck pain treatment of any kind in physiotherapy within the previous three months.

Randomization

Randomization is done using the draw method.

Interventions

All participants received treatment five times per week for six weeks, with each session.

Group A (n=25) In order to properly manage cervical discomfort, Group A's physiotherapy treatment plan includes manual therapy techniques like the McKenzie method, conventional therapy, Interferential Therapy (IFT), and the use of hot packs. To encourage muscular relaxation, enhance local blood circulation, and prime the tissues for additional intervention, a wet heat pack is applied to the cervical region for 15 to 20 minutes at the start of each session. IFT, which helps relieve pain, muscle spasm, and inflammation, is then given for 15 to 20 minutes utilizing a four-pole approach with a frequency range of 90 to 130 Hz. McKenzie exercises, which are designed to determine the patient's preferred orientation, are introduced following electrotherapy. Depending on the concentration of symptoms, these exercises typically start with cervical retractions before moving on to extension motions in prone or standing positions. The patient's tolerance is used to gradually raise the intensity of the repetitions, which range from three to five sets of ten. These exercises aid in posture correction, pain localization, and disc rehydration. Traditional physiotherapy, such as chin tucks, active range of motion exercises, scapular stability exercises, isometric neck strengthening, and postural correction training, is offered in addition to McKenzie therapy. In order to prevent recurrence, patients are also counseled on appropriate body mechanics and taught on ergonomic adjustments. Over the course of six weeks, the treatment is administered five times a week, with periodic evaluation and advancement determined by each patient.

Group B (n=25) In order to manage cervical discomfort and enhance functional outcomes, Group B's physiotherapy treatment plan combines traditional therapy, Interferential Therapy (IFT), the use of hot packs, and an organized exercise-based physiotherapy program. In order to relax muscle tension, improve blood flow, and prepare the soft tissues for further therapeutic treatments, a moist heat pack is applied to the cervical region for 15 to 20 minutes at the beginning of each session. Then, using a four-pole approach with a frequency range of 90–130 Hz, IFT is given for 15–20 minutes to relieve pain, lessen local inflammation, and minimize

muscular spasm. Patients receive a thorough exercise-based physiotherapy regimen following the electrotherapy modalities. In order to restore normal joint mobility, this involves active range of motion (ROM) exercises for the cervical spine that focus on flexion, extension, lateral flexion, and rotation. Exercises for isometric neck strengthening are also included to improve the stability and endurance of the cervical muscles. To enhance postural alignment and lessen mechanical strain on the cervical spine, the treatment also includes exercises for chin tucks, shoulder retractions, and scapular stabilization. To relieve muscle tension and regain flexibility, patients are gradually progressed to stretching exercises for the levator scapulae, sternocleidomastoid, and upper trapezius muscles. Throughout the program, emphasis is also placed on ergonomic guidance, postural instruction, and adjustments to daily activities. For six weeks, this treatment is given five times a week, with the intricacy and intensity of the exercises being modified according to the patient's tolerance and progress.

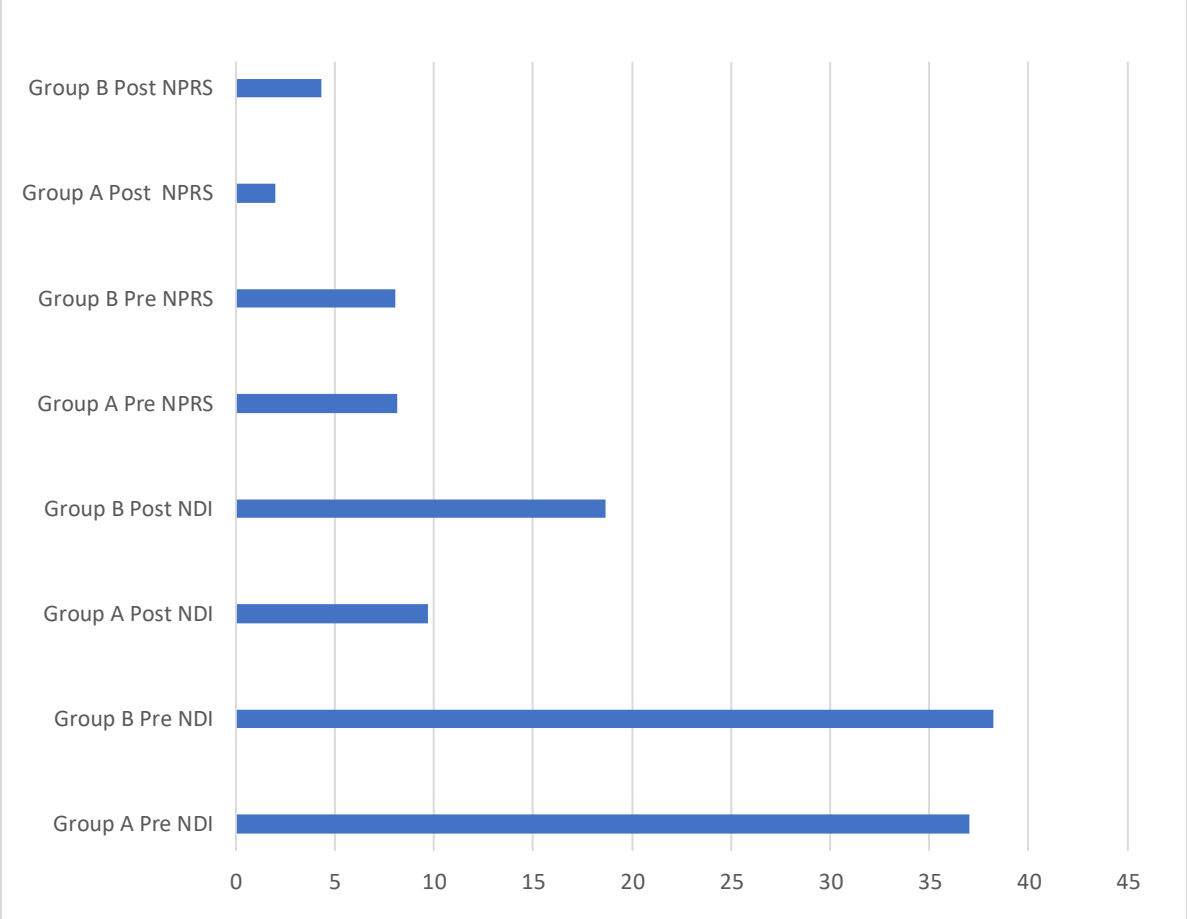
Outcome Measures

1. NPRS – Numeric Pain Rating Scale on chronic neck pain.
2. NDI - Neck Disability Index on chronic pain.

Statistical Analysis:

Measure	Group	Mean	Sig. (2-tailed)	Std. Deviation
Pre NDI	Group A	37.0400	.014	1.27410
	Group B	38.2400	.014	1.94251
Post NDI	Group A	9.7200	.000	1.79165
	Group B	18.6800	.000	1.79629
Pre NPRS	Group A	8.1600	.641	.80000

	Group B	8.0400	.641	.84063
Post NPRS	Group A	2.0000	.000	.70711
	Group B	4.3200	.000	.80208



- NPRS – Numeric Pain Rating Scale
- NDI – Neck Disability Test

Both groups had high NDI scores before to therapy, which indicated substantial disability: Group B's mean score was somewhat higher at 38.24, while Group A's was 37.04. Given that the

difference was statistically significant (p = 0.014), Group B may have had a little higher disability in the beginning. Both groups exhibited improvement after the intervention, however Group A's mean post-NDI was 9.72, while Group B's was 18.68. Additionally, the difference was statistically significant (p = 0.000), suggesting that Group A's intervention was more successful in lowering handicap linked to the neck. Prior to treatment Group A's and Group B's NPRS scores were 8.16 and 8.04, respectively, with no discernible difference (p = 0.641). However, following therapy, Group B's mean NPRS decreased to 4.32 and Group A's dramatically decreased to 2.00. This difference was statistically significant (p = 0.000), demonstrating once more how Group A experienced less discomfort.

The statistical results are graphically supported by the bar graph. It displays Both groups' pre-treatment NDI and NPRS values were higher. a greater drop in both metrics for Group A after therapy than for Group B. significant variations in post-treatment NDI and NPRS scores, with Group A obtaining significantly lower scores.

Result: The findings unequivocally show that after the intervention, Group A had better clinical outcomes than Group B. Significant neck-related pain and disability were indicated by the high initial scores of both groups on the Neck Disability Index (NDI) and Numerical Pain Rating Scale (NPRS). But after therapy, Group A's decline in NDI and NPRS scores was noticeably larger. Group B's mean post-NDI score was higher at 18.68, whereas Group A's fell to 9.72; the difference was statistically significant (p = 0.000). Likewise, there was a statistically significant difference (p = 0.000) between Group A's post-treatment NPRS score of 2.00 and Group B's score of 4.32. These results, which are corroborated by the bar graph, imply that Group A's intervention was superior to Group B in terms of lowering neck-related impairment and pain severity.

Conclusion: Together, the data and graph show that Group A's intervention was substantially more successful than Group B's in lowering neck impairment and pain severity. Following the intervention, Group A showed statistically significant decreases in both NDI and NPRS, indicating higher clinical improvement.

References (Vancouver Style)

1. Fejer R, Kyvik KO, Hartvigsen J. The prevalence of neck pain in the world population: a systematic critical review of the literature. *Eur Spine J.* 2006;15(6):834–48.
2. Hoy D, March L, Woolf A, et al. The global burden of neck pain: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis.* 2014;73(7):1309–15.
3. Childs JD, Cleland JA, Elliott JM, et al. Neck pain: clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association. *J Orthop Sports Phys Ther.* 2008;38(9):A1–34.
4. Gross AR, Paquin JP, Dupont G, et al. Exercises for mechanical neck disorders. *Cochrane Database Syst Rev.* 2016;(1):CD004250.
5. Fernández-de-las-Peñas C, Cleland JA, Huijbregts P. *Manual Therapy for Musculoskeletal Pain Syndromes: An Evidence- and Clinical-Informed Approach.* Elsevier Health Sciences; 2015.
6. Bialosky JE, Bishop MD, George SZ. The mechanisms of manual therapy in the treatment of musculoskeletal pain: a comprehensive model. *Man Ther.* 2009;14(5):531–8.
7. Vicenzino B, Hing W, Rivett DA, Hall T. *Mobilisation with Movement: The Art and the Science.* Churchill Livingstone; 2011.
8. Kerry R, Taylor AJ, Mitchell J, McCarthy CJ. Manual therapy and cervical artery dysfunction: existing understanding and rationale for change. *Musculoskelet Sci Pract.* 2018;33:41–5.
9. Miller J, Gross A, D'Sylva J, et al. Manual therapy and exercise for neck pain: a systematic review. *Man Ther.* 2010;15(4):334–54.
10. Falla D, Jull G, Hodges P. Training the cervical muscles with prescribed motor learning strategies in patients with chronic neck pain: a randomized controlled trial. *Phys Ther.* 2007;87(6):778–86.

11. Jull G, Sterling M, Falla D, Treleaven J, O'Leary S. *Whiplash, Headache, and Neck Pain: Research-Based Directions for Physical Therapies.* Elsevier Health Sciences; 2008.

12. Ylinen J, Takala EP, Nykanen M, et al. Active neck muscle training in the treatment of chronic neck pain in women: a randomized controlled trial. *JAMA.* 2003;289(19):2509–16.

13. Linton SJ, Shaw WS. Impact of psychological factors in the experience of pain. *Phys Ther.* 2011;91(5):700–11.

14. Bronfort G, Evans R, Anderson AV, et al. Spinal manipulation, medication, or home exercise with advice for acute and subacute neck pain: a randomized trial. *Ann Intern Med.* 2012;156(1_Part_1):1–10.

15. Kay TM, Gross A, Goldsmith CH, et al. Exercises for mechanical neck disorders. *Cochrane Database Syst Rev.* 2012;(8):CD004250.

16. Moher D, Hopewell S, Schulz KF, et al. CONSORT 2010 Explanation and Elaboration: updated guidelines for reporting parallel group randomized trials. *BMJ.* 2010;340:c869.

17. White, J.C., Sweet, W.H., Hawkins, R., and Nilges, R.G. Anterolateral cordotomy: results, complications and causes of failure. *Brain* 73:346-367, 1950.

18. Turk, D.C., and Kerns, R.D. Conceptual issues in the assessment of clinical pain. *International Journal of Psychiatry in Medicine* 13:57-68, 1983-1984.

19. Richardson, D.E., and Akil, H. Pain reduction by electrical brain stimulation in man. *Journal of Neurosurgery* 47:178-183, 1977.

20. Sterling, M., & Kenardy, J. (2008). Physical and psychological aspects of whiplash: Important considerations for primary care assessment. *Manual Therapy, 13*(2), 93-102.