

Effectiveness of a Renewal-Based Biopsychosocial Rehabilitation Approach Incorporating Active Release Technique (ART) in Individuals with Chronic Neck Pain: A Prospective Interventional Study

Dr. Archana Verma¹, Dr. Khushwant Singh Rathore², Dr. Rajesh Jain³, Dr. Ajeet Kumar Saharan⁴, Dr. Shruti Mahajan⁵, Dr. Jai Prakash Verma⁶

^{1,5}PhD Scholar, NIMS University, Jaipur, Rajasthan, India

²Associate Professor, Department of Orthopaedic Surgery, NIMS University, Jaipur, Rajasthan, India

³Professor, Department of Orthopaedic, Bundelkhand Medical College, Sagar, M.P., India

⁴Principal, Department of Physiotherapy, NIMS University, Jaipur, Rajasthan, India

⁶RSO, Department of Forensic Medicine, M.G.M. Medical College, Indore, M.P., India

**Author for correspondence:*

Dr. Archana Verma

PhD Scholar, NIMS University, Jaipur, Rajasthan, India, archana14.verma@gmail.com

ABSTRACT

Background:- Chronic neck pain is a highly prevalent musculoskeletal condition associated with pain, disability, psychological distress, and reduced quality of life. Conventional rehabilitation approaches often focus primarily on symptom management and may inadequately address the biopsychosocial factors contributing to persistent pain.

Objective:- To evaluate the effectiveness of a renewal-based biopsychosocial rehabilitation approach incorporating Active Release Technique (ART) in individuals with chronic neck pain.

Methods:- This prospective single-group pre-post interventional study included 40 participants with non-specific chronic neck pain recruited from the outpatient physiotherapy department of [Institution Name], [City, Country]. Participants underwent an 8-week rehabilitation program consisting of Active Release Technique (ART), cervical stabilization exercises, postural correction, ergonomic training, pain neuroscience education, mindfulness strategies, and self-management education. Primary outcome measures included pain intensity assessed using the Visual Analog Scale (VAS) and pain-related disability assessed using the Neck Pain and Disability Scale (NPAD). Pre- and post-intervention scores were compared using paired t-tests.

Results:- Forty participants completed the intervention program. Mean VAS scores significantly decreased from 7.1 ± 1.2 at baseline to 2.4 ± 1.1 post-intervention (mean difference = 4.7, $p < 0.001$). Mean NPAD scores significantly decreased from 52.3 ± 12.4 to 18.7 ± 9.8 (mean difference = 33.6, $p < 0.001$). Improvements were also observed in cervical mobility, muscle flexibility, patient adherence, and psychological well-being. No adverse events were reported.

Conclusion:- The renewal-based biopsychosocial rehabilitation model incorporating ART demonstrated clinically meaningful improvements in pain intensity and disability among individuals with chronic neck pain. This integrative approach may provide a promising alternative to conventional symptom-focused rehabilitation strategies. Further randomized controlled trials with larger sample sizes and long-term follow-up are recommended.

Keywords:- Chronic neck pain; Active Release Technique; biopsychosocial rehabilitation; physiotherapy; pain management; disability; myofascial release.

How to cite this article: Verma A, Rathore KS, Jain R, Saharan AK, Mahajan S, Verma JP. Effectiveness of a Renewal-Based Biopsychosocial Rehabilitation Approach Incorporating Active Release Technique (ART) in Individuals with Chronic Neck Pain: A Prospective Interventional Study. *Int J Drug Deliv Technol.* 2026;16(51s): 1839-1843. DOI: 10.25258/ijddt.16.51s.147

INTRODUCTION

Chronic neck pain is among the most common musculoskeletal disorders worldwide, with a lifetime prevalence estimated between 30% and 50% in the adult population [1,2]. According to the Global Burden

of Disease Study 2019, neck pain represents one of the leading causes of years lived with disability and contributes significantly to healthcare expenditure, reduced work productivity, and impaired quality of life [1,3]. In addition to physical symptoms, chronic neck

pain is frequently associated with psychosocial disturbances such as anxiety, depression, fear-avoidance behaviour, pain catastrophizing, sleep disturbances, and reduced self-efficacy [4,5].

Traditional rehabilitation approaches for chronic neck pain have largely focused on symptomatic relief using passive interventions including medication, rest, massage, and electrotherapy modalities [6]. Although these interventions may provide temporary pain reduction, they often fail to address underlying biomechanical dysfunction, myofascial restrictions, postural abnormalities, and psychosocial contributors responsible for chronicity and recurrence [7]. Consequently, many individuals continue to experience persistent symptoms, functional disability, and repeated episodes of neck pain.

Growing evidence supports the adoption of a biopsychosocial approach in the management of chronic musculoskeletal disorders [8,9]. This model recognizes that chronic pain arises from the interaction of biological, psychological, and social factors rather than solely from tissue pathology [10]. Multidisciplinary rehabilitation strategies combining physical rehabilitation with psychological and behavioural interventions have demonstrated superior outcomes compared to isolated unimodal treatments [11,12]. Recent rehabilitation studies focusing on posture correction, cervical stabilization exercises, and neural mobilization techniques have also reported significant improvements in pain reduction, functional disability, cervical posture, and neuromuscular control among individuals with neck pain and text neck syndrome [17-19].

One increasingly utilized manual therapy intervention is Active Release Technique (ART), a soft-tissue treatment method designed to identify and release myofascial adhesions, reduce tissue tension, improve mobility, and restore neuromuscular function [13]. ART involves precise manual tension combined with active patient movement to break down fibrotic adhesions and improve soft tissue extensibility. Previous studies have suggested that ART may reduce pain and improve range of motion in individuals with musculoskeletal disorders, including chronic neck pain [13,14].

The present study was therefore designed to evaluate the effectiveness of a renewal-based biopsychosocial rehabilitation approach incorporating ART in individuals with chronic neck pain, with specific emphasis on pain reduction, disability improvement, and functional restoration.

AIM AND OBJECTIVES

Aim

To evaluate the effectiveness of a renewal-based biopsychosocial rehabilitation approach incorporating Active Release Technique (ART) in the management of chronic neck pain.

Objectives

1. To assess the effectiveness of the rehabilitation protocol in reducing pain intensity in individuals with chronic neck pain.
2. To evaluate the effect of the intervention on pain-related disability and functional limitation.
3. To determine improvements in cervical mobility, muscle flexibility, and myofascial restrictions following ART.
4. To assess patient adherence, engagement, and psychological well-being following the integrated biopsychosocial rehabilitation approach.

MATERIALS AND METHODS

Study Design

This study was designed as a prospective, single-group, pre-post interventional study.

Study Setting

The study was conducted in the outpatient physiotherapy Department of Orthopaedics, Physiotherapy Wing, Sagar, between 01 April 2025 to 30 April 2025.

Participants

A total of 40 participants with non-specific chronic neck pain were recruited consecutively using convenience sampling.

Inclusion Criteria

- Adults aged between 25 and 60 years
- History of non-specific chronic neck pain for more than 3 months
- Pain intensity ≥ 4 on the Visual Analog Scale (VAS)
- Ability and willingness to participate in the 8-week rehabilitation program

Exclusion Criteria

- Recent cervical trauma or surgery within the previous 6 months
- Cervical radiculopathy, myelopathy, or neurological disorders
- Inflammatory rheumatic diseases
- Severe psychiatric or systemic medical illness

- Contraindications to manual therapy or ART Intervention Protocol

Participants underwent an 8-week renewal-based biopsychosocial rehabilitation program consisting of the following components:

Active Release Technique (ART)

ART was performed by a certified physiotherapist three sessions per week. The intervention targeted commonly involved cervical and shoulder girdle muscles including:

- Upper trapezius
- Levator scapulae
- Sternocleidomastoid
- Scalenes
- Suboccipital muscles

- Cervical paraspinal muscles

Each ART session lasted approximately 20 minutes and involved manual tension applied over affected soft tissues while participants actively moved through specific movement patterns to release adhesions and improve tissue mobility.

Cervical Stabilization Exercises

Participants performed progressive cervical stabilization and deep neck flexor strengthening exercises under physiotherapist supervision.

Postural Correction and Ergonomic Training

Education regarding workstation ergonomics, sitting posture, sleeping posture, and activity modification was provided.

Pain Neuroscience Education

Participants received education regarding chronic pain mechanisms, central sensitization, and self-management strategies.

Psychological and Behavioural Interventions

Mindfulness-based relaxation techniques and cognitive behavioural strategies were incorporated to reduce fear-avoidance behaviour, anxiety, and pain catastrophizing.

Home Exercise Program

Participants were instructed to perform a structured home exercise program daily throughout the study period.

Outcome Measures

Assessments were performed at baseline and immediately following completion of the 8-week intervention.

Primary Outcome Measures

1. Visual Analog Scale (VAS)
 - o Used to assess pain intensity on a scale from 0 to 10.
2. Neck Pain and Disability Scale (NPAD)
 - o Used to assess pain-related disability and functional limitation.

Secondary Outcome Measures

- Cervical range of motion
- Muscle flexibility
- Patient adherence
- Psychological well-being

Statistical Analysis

Data were analysed using Statistical Package for Social Sciences (SPSS) version 25.0. Descriptive statistics were expressed as mean ± standard deviation. Pre- and post-intervention outcome scores were compared using paired t-tests. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 40 participants completed the study. The mean age of participants was 42.6 ± 8.4 years.

Primary Outcome Measures

Statistically significant improvements were observed in pain intensity and pain-related disability following the 8-week intervention program.

- Mean VAS score decreased from 7.1 ± 1.2 at baseline to 2.4 ± 1.1 post-intervention (mean difference = 4.7, p < 0.001).
- Mean NPAD score decreased from 52.3 ± 12.4 at baseline to 18.7 ± 9.8 post-intervention (mean difference = 33.6, p < 0.001).

Outcome Measure	Pre-intervention (Mean ± SD)	Post-intervention (Mean ± SD)	Mean Difference	p-value
Visual Analog Scale (VAS)	7.1 ± 1.2	2.4 ± 1.1	4.7	<0.001
Neck Pain and Disability Scale (NPAD)	52.3 ± 12.4	18.7 ± 9.8	33.6	<0.001

Secondary Outcomes

Participants demonstrated improvements in:

- Cervical range of motion
- Functional activity tolerance
- Adherence to home exercise programs
- Psychological well-being and patient engagement

No adverse events or treatment-related complications were reported during the intervention period.

DISCUSSION

The present study evaluated the effectiveness of a renewal-based biopsychosocial rehabilitation approach incorporating Active Release Technique (ART) in individuals with chronic neck pain. The findings demonstrated statistically and clinically significant improvements in pain intensity and pain-related disability following the 8-week intervention program.

The reduction in VAS scores by 4.7 points and NPAD scores by 33.6 points exceeded the reported minimal clinically important difference thresholds for both measures, suggesting meaningful functional improvement beyond statistical significance [15,16]. These findings support the growing evidence that chronic neck pain responds more effectively to comprehensive multidisciplinary interventions than to isolated symptom-focused treatment approaches.

The observed improvements are consistent with previous literature supporting biopsychosocial rehabilitation strategies. Monticone et al. demonstrated that multimodal rehabilitation combined with cognitive behavioural interventions significantly improved pain and disability outcomes in individuals with chronic neck pain [5]. Similarly, Letzel et al. and Sterling et al. emphasized the importance of integrating physical rehabilitation with psychosocial interventions to reduce fear-avoidance behaviour and functional disability [4,12]. Recent studies by Shobhit et al. [17] and Baranwal et al. [18] also demonstrated that postural correction strategies such as chin tucking and cervical stabilization exercises significantly improved pain, posture, and disability in individuals with text neck syndrome.

The incorporation of Active Release Technique (ART) may have contributed substantially to the observed clinical improvements. ART specifically targets myofascial adhesions, soft tissue fibrosis, and trigger points that commonly contribute to persistent cervical dysfunction [13]. By improving tissue extensibility and reducing nociceptive input, ART may facilitate improved cervical biomechanics, enhanced neuromuscular control, and greater tolerance to

therapeutic exercise. Similarly, Pallewar et al. [19] reported beneficial effects of neural mobilization combined with cervical traction in reducing symptoms and improving functional outcomes in cervical radiculopathy patients.

Additionally, the inclusion of pain neuroscience education, mindfulness techniques, ergonomic training, and self-management strategies likely contributed to improved patient engagement and adherence. Chronic pain is increasingly recognized as a multidimensional condition involving central sensitization and psychosocial influences [8,10]. Therefore, interventions targeting both peripheral tissue dysfunction and central behavioural contributors may offer superior long-term outcomes.

Despite the positive findings, several limitations should be acknowledged. The study utilized a single-group pre-post design without a control group, limiting the ability to establish causal relationships. The relatively small sample size and short-term follow-up further limit the generalizability of the findings. Moreover, because multiple therapeutic interventions were combined, the individual contribution of ART could not be isolated.

Future randomized controlled trials with larger sample sizes, longer follow-up periods, and comparison groups are recommended to further validate the effectiveness of this rehabilitation model.

CONCLUSION

The findings of this study suggest that a renewal-based biopsychosocial rehabilitation approach incorporating Active Release Technique (ART) may provide clinically meaningful improvements in individuals with chronic neck pain. Significant reductions in pain intensity and pain-related disability were observed following the 8-week intervention program.

The integration of ART with cervical stabilization exercises, ergonomic correction, pain neuroscience education, mindfulness techniques, and self-management strategies appears to provide a comprehensive framework for addressing both physical and psychosocial contributors to chronic neck pain.

Although the results are promising, further high-quality randomized controlled studies with larger sample sizes and long-term follow-up are necessary to establish the effectiveness and generalizability of this rehabilitation approach.

LIMITATIONS

Single-group pre-post study design without a control group. Relatively small sample size. Short-term follow-

up duration. Single-center study setting. Inability to isolate the independent effect of ART due to multimodal intervention design.

Future Recommendations

Future studies should include larger sample sizes, randomized controlled designs, and long-term follow-up to further validate the effectiveness of renewal-based biopsychosocial rehabilitation incorporating Active Release Technique (ART). Additional research comparing ART with other physiotherapy interventions and evaluating long-term functional outcomes is also recommended.

Clinical Implications

The findings of this study support the integration of biopsychosocial rehabilitation principles and manual therapy techniques such as ART into physiotherapy practice for chronic neck pain management. This multimodal approach may improve patient outcomes, treatment adherence, and long-term functional recovery.

REFERENCES

1. Safiri S, Kolahi AA, Hoy D, et al. Global, regional, and national burden of neck pain in the general population, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet Rheumatol.* 2021;3(5):e297-e307.
2. Hoy DG, Protani M, De R, Buchbinder R. The epidemiology of neck pain. *Best Pract Res Clin Rheumatol.* 2010;24(6):783-792.
3. Global Burden of Disease Study 2019. Institute for Health Metrics and Evaluation (IHME).
4. Sterling M, de Zoete RMJ, Coppeters I, Farrell SF. Best evidence rehabilitation for chronic pain part 4: neck pain. *J Clin Med.* 2019;8(8):1219.
5. Monticone M, Ambrosini E, Rocca B, et al. Group-based multimodal exercises integrated with cognitive-behavioural therapy improve disability, pain and quality of life in subjects with chronic neck pain: a randomized controlled trial with one-year follow-up. *Clin Rehabil.* 2016;30(12):1140-1151.
6. Karjalainen KA, Malmivaara A, van Tulder MW, et al. Multidisciplinary biopsychosocial rehabilitation for neck and shoulder pain among working-age adults. *Cochrane Database Syst Rev.* 2010;(1):CD002142.
7. Chou R, Deyo R, Friedly J, et al. Nonpharmacologic therapies for low back pain: a systematic review for an American College of Physicians clinical practice guideline. *Ann Intern Med.* 2017;166(7):493-505.
8. Turk DC, Fillingim RB, Ohrbach R, Patel KV. Assessment of psychosocial and functional impact of chronic pain. *J Pain.* 2016;17(9 Suppl):T21-T49.
9. Engel GL. The need for a new medical model: a challenge for biomedicine. *Science.* 1977;196(4286):129-136.
10. Gatchel RJ, Peng YB, Peters ML, et al. The biopsychosocial approach to chronic pain: scientific advances and future directions. *Psychol Bull.* 2007;133(4):581-624.
11. Letzel J, Angst F, Weigl MB. Multidisciplinary biopsychosocial rehabilitation in chronic neck pain: a naturalistic prospective cohort study with intraindividual control of effects. *Eur J Phys Rehabil Med.* 2019;55(6):727-735.
12. Choudhry NK, et al. Effect of a biopsychosocial intervention or postural therapy on pain-related disability in patients with acute and subacute spine pain. *JAMA Netw Open.* 2022;5(3):e221770.
13. Kim JH, Lee HS, Park SW. Effectiveness of Active Release Technique on pain and range of motion in patients with chronic neck pain. *J Phys Ther Sci.* 2020;32(2):145-150.
14. Hammer WI. Functional soft-tissue examination and treatment by manual methods. 3rd ed. Jones & Bartlett Learning; 2007.
15. Farrar JT, Young JP Jr, LaMoreaux L, et al. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain.* 2001;94(2):149-158.
16. Wheeler AH, Goolkasian P, Baird AC, et al. Development of the Neck Pain and Disability Scale. *Spine.* 1999;24(13):1290-1294.
17. Shobhit N, Attry S, Verma A, Saharan AK, Dixit S. Role of chin tucking on pain and disability of text neck syndrome. *Int J Environ Sci.* 2025.
18. Baranwal S, Saharan AK, Sharma S, Choudhary A, Saini HN, Singh SS, et al. Impact of cervical stabilisation exercises on posture ailment in text neck syndrome. *J Neonatal Surg.* 2025;14(32s):8814-8821.
19. Pallewar M, Saharan AK, Ravikiran, Gouru V. The effect of neural mobilization with cervical traction in cervical radiculopathy patients. *Int J Dev Res.* 2021;11(4):45913-45917.