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Original Research Article

Impact of Levator Scapulae Stretching Combined with Transcutaneous Electrical Nerve Stimulation on Pain, Cervical Range of Motion, and Functional Disability in Individuals with Cervical Radiculopathy: A Prospective Case Series

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Abstract: ***Background*:** Cervical radiculopathy is a common neuromusculoskeletal disorder characterized by neck pain radiating into the upper extremity, often accompanied by sensory disturbances, weakness, and functional disability. Conservative physiotherapy interventions remain the primary treatment approach. Levator scapulae tightness contributes to altered cervical biomechanics, whereas Transcutaneous Electrical Nerve Stimulation (TENS) is widely used for pain modulation. However, evidence regarding the combined effect of levator scapulae stretching and TENS in cervical radiculopathy remains limited. ***Objective*:** To evaluate the effectiveness of levator scapulae stretching combined with TENS on pain intensity, cervical range of motion (CROM), and functional disability in individuals with cervical radiculopathy. ***Methods*:** A prospective case series was conducted on ten participants diagnosed clinically with cervical radiculopathy. Participants received passive levator scapulae stretching followed by TENS (100 Hz continuous mode) four times per week for four weeks. Outcome measures included Numerical Pain Rating Scale (NPRS), cervical range of motion measured using a universal goniometer, and Neck Disability Index (NDI). Assessments were performed before and after intervention. ***Results*:** The mean NPRS score decreased from 8.8 ± 0.63 to 1.3 ± 0.67. Mean cervical flexion improved from 31.5° ± 1.90° to 38.5° ± 1.58°. Cervical extension improved from 48.6° ± 3.75° to 50.3° ± 1.57°. Significant improvements were observed in lateral flexion and rotation movements. The mean NDI score improved from 25.3 ± 5.93 to 3.2 ± 1.40. ***Conclusion*:** Levator scapulae stretching combined with TENS demonstrated clinically meaningful improvements in pain, cervical mobility, and functional disability among individuals with cervical radiculopathy. Further randomized controlled trials with larger sample sizes are recommended to confirm these findings.

Keywords: Cervical Radiculopathy, Levator Scapulae Stretching, TENS, Neck Disability Index, Cervical Range of Motion, Physiotherapy.

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INTRODUCTION

Cervical radiculopathy is a pathological condition involving compression or irritation of cervical nerve roots resulting in pain, sensory disturbances, muscle weakness, and functional limitations. The prevalence of cervical radiculopathy has increased due to sedentary lifestyles, prolonged computer use, poor posture, and degenerative cervical spine disorders.

Patients commonly present with neck pain radiating to one or both upper extremities, often associated with numbness, tingling, reduced cervical mobility, and impaired quality of life. Conservative

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treatment remains the first-line management strategy, particularly for patients without progressive neurological deficits.

Transcutaneous Electrical Nerve Stimulation (TENS) is a widely accepted electrotherapeutic modality used to reduce pain through activation of large-diameter afferent fibers and endogenous opioid mechanisms. Similarly, stretching interventions have demonstrated effectiveness in restoring muscle flexibility, reducing myofascial restrictions, and improving joint mobility.

The levator scapulae muscle plays an important role in maintaining cervical and scapular alignment. Tightness or dysfunction of this muscle may contribute to altered biomechanics, increased cervical loading, and pain generation. Despite the individual effectiveness of TENS and stretching interventions, literature investigating their combined effects in cervical radiculopathy remains scarce.

Therefore, this study aimed to investigate the impact of levator scapulae stretching combined with TENS on pain intensity, cervical range of motion, and functional disability in individuals diagnosed with cervical radiculopathy.

MATERIALS AND METHODS

Study Design: A prospective case series was conducted between January 2026 and March 2026 at a physiotherapy outpatient department.

Participants: Ten participants diagnosed clinically with cervical radiculopathy were recruited.

Inclusion Criteria

- Age between 30 and 50 years
- Positive Spurling test
- Cervical pain with upper limb radiation
- NPRS score ≥ 5
- Willingness to participate

Exclusion Criteria

- Previous cervical spine surgery
- Cervical fractures
- Tumors or infections
- Severe neurological disorders
- Congenital cervical abnormalities

Outcome Measures

Primary Outcomes

- Numerical Pain Rating Scale (NPRS)
- Cervical Range of Motion (CROM)

Secondary Outcome

- Neck Disability Index (NDI)

Intervention

Participants Received:

- Passive levator scapulae stretching until symptom centralization
- TENS at 100 Hz continuous mode
  - Duration: 15 minutes per session
  - Frequency: Four sessions per week
  - Total duration: Four weeks (16 sessions)

Statistical Analysis

- Data were analyzed using descriptive statistics. Results were expressed as mean ± standard deviation. Pre- and post-intervention comparisons were evaluated using paired statistical methods with significance level set at $p < 0.05$.

RESULTS

Demographic Characteristics

A total of ten participants completed the study. Participants included six females and four males. Mean age was 39.4 years, with symptom duration ranging from one month to six months.

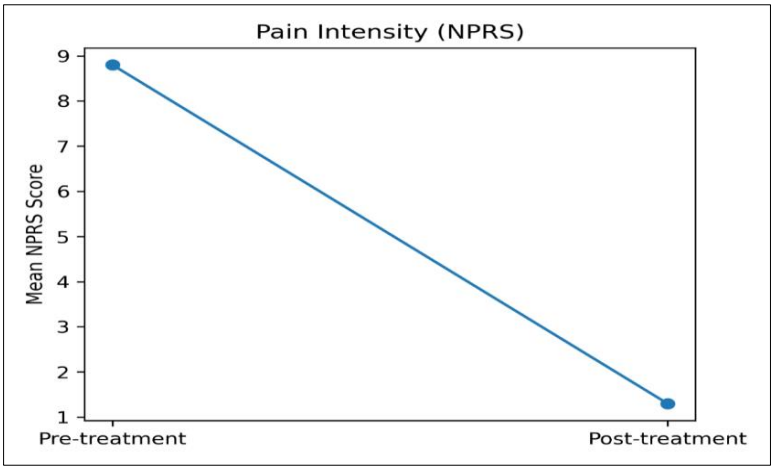


Figure 1: Mean Numerical Pain Rating Scale (NPRS) scores before and after intervention, demonstrating a substantial reduction in pain intensity following four weeks of levator scapulae stretching and TENS

Table 1: Pain Intensity (NPRS)

Variable	Pre-Treatment	Post-Treatment
NPRS	8.8 ± 0.63	1.3 ± 0.67

The mean pain score decreased by approximately 85%.

Table 2: Cervical Range of Motion

Movement	Pre-treatment (Mean ± SD)	Post-treatment (Mean ± SD)
Flexion	31.5 ± 1.90	38.5 ± 1.58
Extension	48.6 ± 3.75	50.3 ± 1.57
Right Lateral Flexion	36.2 ± 3.65	38.7 ± 1.31
Left Lateral Flexion	36.5 ± 3.56	39.3 ± 0.82
Right Rotation	71.5 ± 8.09	76.9 ± 2.51
Left Rotation	73.0 ± 6.79	78.2 ± 0.91

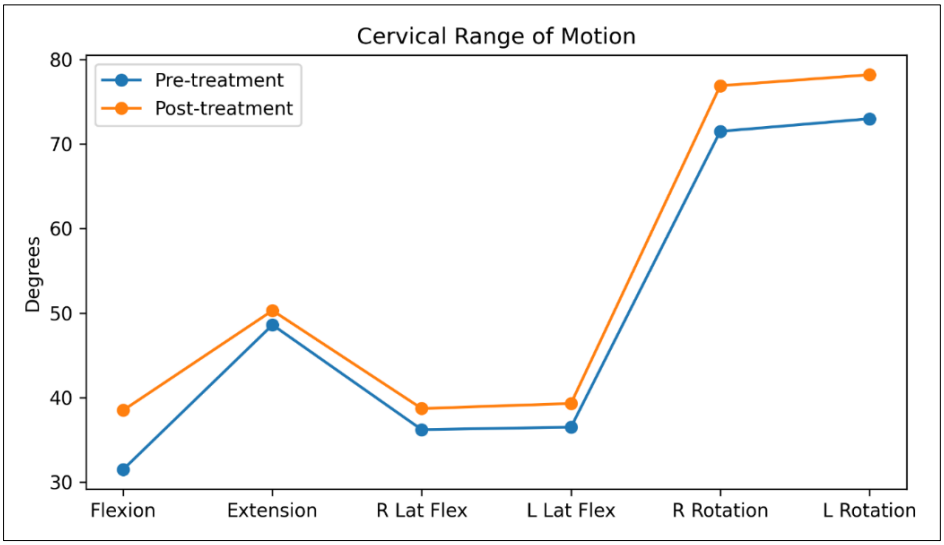


Figure 2: Comparison of pre- and post-intervention cervical range of motion values

Table 3: Functional Disability

Variable	Pre-treatment	Post-treatment
NDI	25.3 ± 5.93	3.2 ± 1.40

Substantial improvement in neck-related functional disability was observed following intervention.

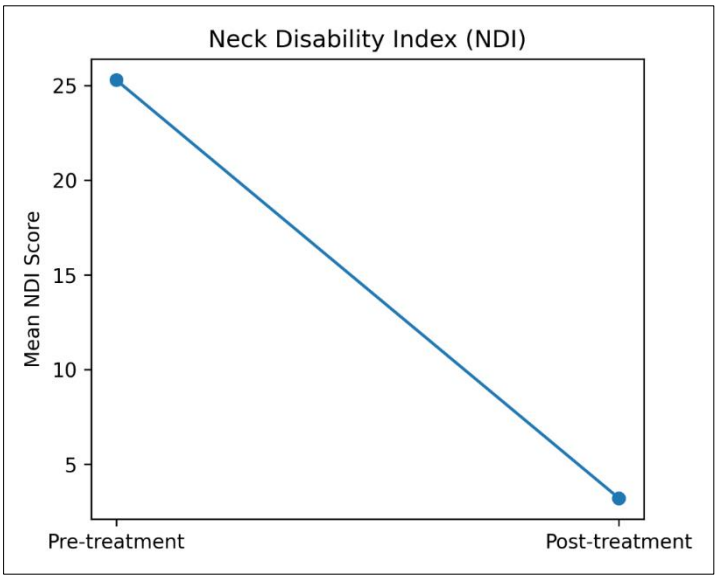


Figure 2: Mean Neck Disability Index (NDI) scores before and after intervention, demonstrating marked improvement in functional disability following treatment

DISCUSSION

The findings of this case series demonstrated that levator scapulae stretching combined with TENS resulted in notable improvements in pain intensity, cervical mobility, and functional disability among individuals with cervical radiculopathy.

The significant reduction in pain intensity observed in this study may be attributed to the analgesic mechanisms of TENS. According to the gate control theory, stimulation of large-diameter afferent fibers inhibits nociceptive transmission at the spinal level. Furthermore, TENS has been shown to facilitate endogenous opioid release, thereby reducing pain perception.

Levator scapulae stretching likely contributed to symptom improvement by reducing muscle tightness, improving soft tissue extensibility, and restoring cervical movement patterns. Improvements in cervical range of motion may be explained by decreased pain, reduced muscle guarding, and enhanced neuromuscular control.

The reduction in NDI scores suggests that improvements in pain and mobility translated into enhanced performance of daily activities. These findings are consistent with previous studies investigating stretching, myofascial release, and electrotherapy interventions in patients with cervical spine disorders.

From a clinical perspective, this intervention is cost-effective, non-invasive, and easily incorporated into routine physiotherapy practice.

Limitations

- Small sample size
- Absence of a control group
- No randomization
- Lack of long-term follow-up
- Single-center study

CONCLUSIONS

The results of this prospective case series suggest that levator scapulae stretching combined with TENS may be an effective conservative physiotherapy intervention for individuals with cervical radiculopathy. The intervention demonstrated substantial improvements in pain intensity, cervical range of motion, and functional disability after four weeks of treatment. Larger randomized controlled trials are required to establish definitive clinical effectiveness.

Conflicts of Interest: The authors declare no conflict of interest.

Funding: No external funding was received for this study.

Human Ethics: Written informed consent was obtained from all participants prior to participation in the study.

REFERENCES

- Peolsson A, Peterson G, Hermansen A, Ludvigsson ML, Dedering Å, Löfgren H. Physiotherapy after anterior cervical spine surgery for cervical disc disease: study protocol of a prospective randomised study to compare internet-based neck-specific exercise with prescribed physical activity. BMJ Open. 2019 Feb 19;9(2):e027387. doi: 10.1136/bmjopen-2018-027387. PMID: 30782952; PMCID: PMC6377535.
- Benini A. Clinical features of cervical root compression C5-C8 and their variations. Neuro-orthopedics. 1987;4:74-88.
- Caplan LR. Management of cervical radiculopathy. European neurology. 1995 Feb 12;35(6):309-20.
- Eubanks JD. Cervical radiculopathy: nonoperative management of neck pain and radicular symptoms. American family physician. 2010 Jan 1;81(1):33-40.
- Escortell-Mayor E, Riesgo-Fuertes R, Garrido-Elustondo S, Asúnsolo-del Barco A, Díaz-Pulido B, Blanco-Díaz M, Bejerano-Álvarez E, Group TT. Primary care randomized clinical trial: manual therapy effectiveness in comparison with TENS in patients with neck pain. Manual therapy. 2011 Feb 1;16(1):66-73.
- Henry JP, Munakomi S. Anatomy, head and neck, levator scapulae muscles. InStatPearls [Internet] 2023 Aug 28. StatPearls Publishing.
- Low J, Reed A. Electrotherapy explained: principles and practice. (No Title). 2000.
- Childress MA, Becker BA. Nonoperative management of cervical radiculopathy. American family physician. 2016 May 1;93(9):746-54.
- Noori SA, Rasheed A, Aiyer R, Jung B, Bansal N, Chang KV, Ottestad E, Gulati A. Therapeutic ultrasound for pain management in chronic low back pain and chronic neck pain: a systematic review. Pain Medicine. 2020 Jul 1;21(7):1482-93.
- Levine MJ, Albert TJ, Smith MD. Cervical radiculopathy: diagnosis and nonoperative management. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 1996 Nov 1;4(6):305-16.
- Polston DW. Cervical radiculopathy. Neurol Clin. 2007 May;25(2):373-85. doi: 10.1016/j.ncl.2007.01.012. PMID: 17445734.
- Shah KC, Rajshekhar V. Reliability of diagnosis of soft cervical disc prolapse using Spurling's test. British journal of neurosurgery. 2004 Jan 1;18(5):480-3.

- Konin JG, Wiksten DL, Isear JA. Special tests for orthopedic examination. (No Title).
- Vernon H, Mior S. The Neck Disability Index: a study of reliability and validity. Journal of manipulative and physiological therapeutics. 1991 Sep 1;14(7):409-15.
- Honet JC, Puri KA. Cervical radiculitis: treatment and results in 82 patients. Archives of physical medicine and rehabilitation. 1976 Jan 1;57(1):12-6.

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