ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep036

Effectiveness of Nerve Flossing in Cervical Radiculopathy

Aanchal Sandeep Daga[1]; Dr. Vaishali Kale[2]

[1]BPTh Intern, [1]Rashtrasant Janardhan College of Physiotherapy
[2]MPTh (Musculoskeletal Physiotherapy), [2]Associate Professor

[1,2]Department of Musculoskeletal Physiotherapy, Rashtrasant Janardhan Swami College of Physiotherapy, Kokamthan, Maharashtra, India

Publication Date: 2025/09/05

Abstract:

➢ ***Introduction.***

Cervical radiculopathy is a medical condition that results form nerve root compression or inflammation leading to pain, numbness, and weakness extending from neck into upper limbs depending upon which nerve is being affected. Conservative management approaches often include physiotherapy techniques aimed at reducing neural tension and restoring functional mobility. Nerve flossing, also known as neural gliding, is a neurodynamic technique designed to mobilize peripheral nerves and reduce adhesions, potentially alleviating symptoms. However, evidence on its specific effectiveness in cervical radiculopathy remains limited.

➢ ***Methodology***

Thirty people between the ages of 30 and 60 with active neck pain with tingling and numbness in their arms were subjected to pre-post experimental research. The NPRS (Numerical Pain Rating Scale) assessed functional impairment and pain both before and after three weeks of treatment.

➢ ***Results***

The average NPRS score dropped significantly from 6.83 to 2.63 ($t = 17.381$, $p < 0.01$), indicating a noteworthy improvement in pain and neck function post-intervention.

➢ ***Conclusion***

Nerve flossing produced statistically significant pain relief and functional improvement in patients with cervical radiculopathy.

Keywords: *Cervical Radiculopathy, Nerve Flossing, Nerve Compression, Tingling, Numbness.*

How to Cite: Aanchal Sandeep Daga; Dr. Vaishali Kale (2025) Effectiveness of Nerve Flossing in Cervical Radiculopathy. *International Journal of Innovative Science and Research Technology,* 10 (9), 1-7. https://doi.org/10.38124/ijisrt/25sep036

I. INTRODUCTION

The cervical region, commonly referred to as the neck, is a highly intricate anatomical area that links the head to the remainder of the body. It contains essential components such as the cervical vertebrae, spinal cord, nerve roots, major blood vessels, muscles, ligaments, and key passages for respiration and digestion. Structurally, the cervical spine is composed of seven vertebrae (C1–C7), forming the bony support of the neck. These vertebrae not only stabilize the head and allow a wide range of motion but also safeguard the spinal cord and the nerve roots that supply the upper limbs

Between each vertebra lies an intervertebral disc, acting as a cushion to absorb shock and ensure smooth movement. The first two vertebrae—atlas (C1) and axis (C2)—possess distinctive shapes that enable significant head mobility, especially in rotation and flexion. The lower vertebrae (C3–C7) contribute to neck flexion, extension, lateral bending, and rotation. The spinal cord passes through the vertebral canal, while cervical nerve roots emerge between adjacent vertebrae via foramina to provide motor and sensory innervation to the arms, shoulders, and upper chest. Cervical radiculopathy is a neuropathic condition that arises when one or more cervical nerve roots become compressed or irritated, leading to

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep036

neurological and musculoskeletal symptoms. This pathology may result from degenerative changes in the cervical spine, such as intervertebral disc herniation, spondylitis changes, or foraminal narrowing, as well as from traumatic injury. Clinically, its manifestations are diverse and can include localized or radiating neck pain, sensory impairments, motor weakness, and diminished deep tendon reflexes. Painful and restricted neck movements accompanied by muscle spasms are frequent clinical observations. Among neurological signs, the reduction of deep tendon reflexes—most notably in the triceps—is the most consistently reported finding.[2]Cervical radiculopathy not only affects functional mobility but can also significantly impair quality of life, particularly in individuals engaged in physically demanding activities or occupations. Early recognition and accurate diagnosis are essential to prevent progression and to guide appropriate management strategies, which may range from conservative rehabilitation to surgical intervention.[3]Cervical radiculopathy (CR) can be classified according to the specific nerve root involved, each presenting with characteristic patterns of pain, weakness, and reflex changes.[4] Involvement of the C5 nerve root is typically associated with weakness in the deltoid and biceps muscles, accompanied by a reduced biceps reflex. C6 nerve root compression often produces pain radiating toward the thumb, weakness of wrist extensors, and a diminished brachioradialis reflex. C7 radiculopathy is characterized by pain localized to the middle finger, weakness in the triceps, and a reduced triceps reflex. In contrast, C8 involvement commonly manifests as pain in the little finger along with weakness in finger flexors.[5]Conventional rehabilitation strategies for CR primarily employ conservative interventions, including intermittent cervical traction, spinal mobilization or manipulation, and electrotherapeutic modalities such as shortwave diathermy, therapeutic ultrasound, transcutaneous electrical nerve stimulation (TENS), and targeted neck exercises. These approaches aim to restore muscle strength, improve cervical mobility, and alleviate symptoms.[3] More recently, neural mobilization techniques—which involve the controlled application of movements to enhance neural gliding and reduce mechanical strain on the nerve—have been proposed as a targeted intervention that may address the underlying neural dysfunction more directly, potentially offering superior symptomatic relief Conventional rehabilitation strategies for CR primarily employ conservative interventions, including intermittent cervical traction, spinal mobilization or manipulation, and electrotherapeutic modalities such as shortwave diathermy, therapeutic ultrasound, transcutaneous electrical nerve stimulation (TENS), and targeted neck exercises. These approaches aim to restore muscle strength, improve cervical mobility, and alleviate symptoms.[3] More recently, neural mobilization techniques—which involve the controlled application of movements to enhance neural gliding and reduce mechanical strain on the nerve—have been proposed as a targeted intervention that may address the underlying neural dysfunction more directly, potentially offering superior symptomatic relief.[4]

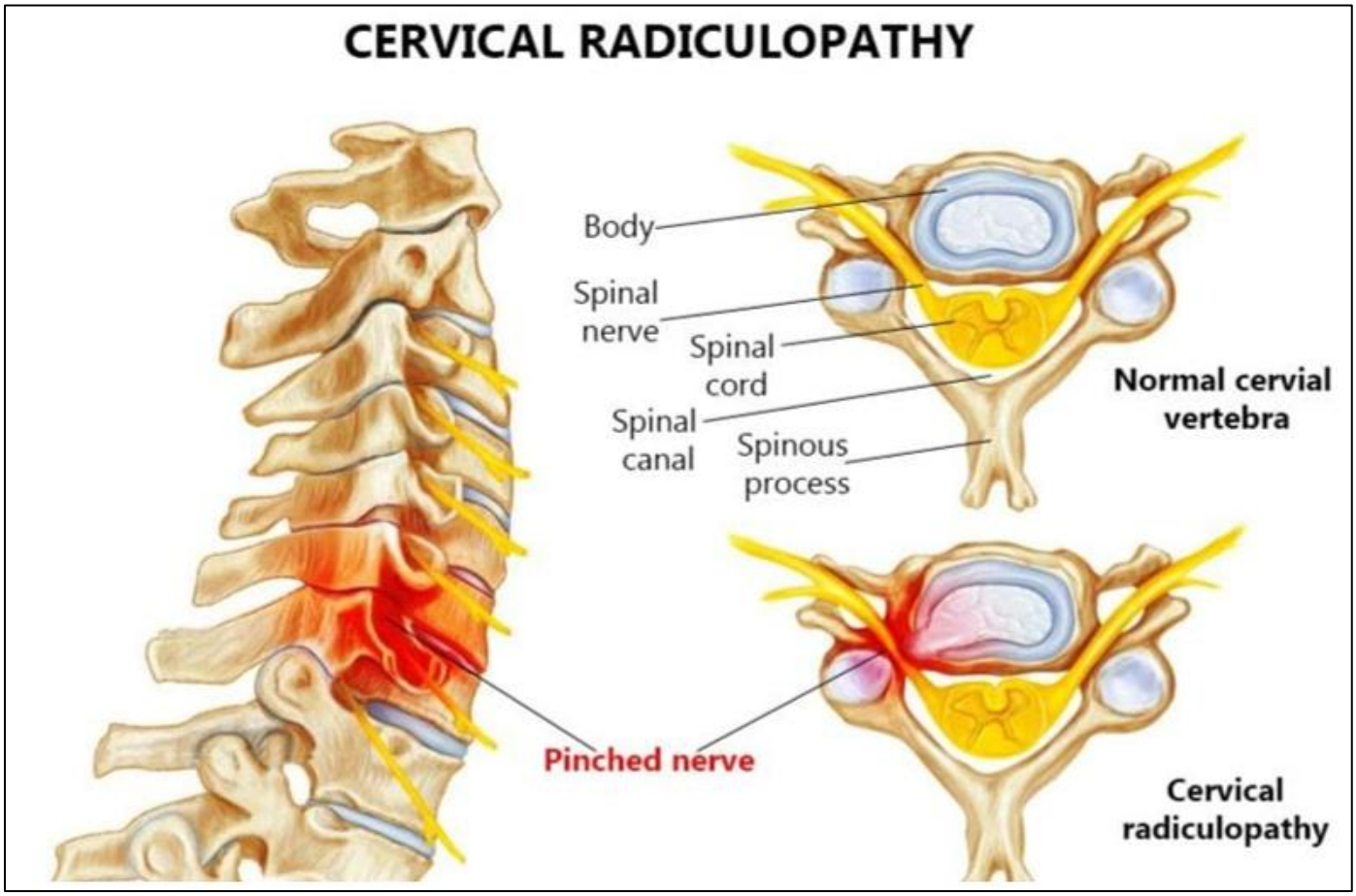

Fig 1 Cervical Radiculopathy Diagram

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep036

Despite reported clinical benefits, the precise physiological mechanisms by which NFT exerts its effects are not yet fully understood.[7] Neurodynamic changes are influenced by the surrounding anatomical structures, often referred to as the mechanical interface, which represents the tissue in closest proximity to the nervous system capable of independent movement relative to it.[8] Presently, the supportive evidence for neural mobilization in clinical practice is largely anecdotal, highlighting the need for rigorous empirical research to clarify its role and effectiveness in cervical radiculopathy management.[9]

II. METHOD

This research adopted a pre–post experimental design to evaluate the effectiveness of the nerve flossing technique in individuals clinically diagnosed with cervical radiculopathy. The study was carried out over six months in the Department of Physiotherapy at RJS College of Physiotherapy, Kokamthan, in collaboration with SJS Hospital. A total of 30 participants, comprising both men and women, were recruited using a convenient sampling approach. The study population primarily included teachers, engineers, and office workers—professions commonly associated with a high prevalence of neck-related disorders. Eligibility was determined through clearly defined inclusion and exclusion criteria, and only those presenting with active neck pain and clinical features of cervical radiculopathy were enrolled. Written informed consent was obtained from all participants before beginning the intervention.

Pain intensity was the primary outcome variable, assessed using the Numerical Pain Rating Scale (NPRS). Each participant underwent eight treatment sessions, with assessments conducted both before and after the intervention. The pre- and post-intervention NPRS scores were then statistically analysed to determine the therapeutic efficacy of the nerve flossing technique.

➢ *Inclusion Criteria:*

- Age between 30 and 60 years
- Neck pain along with tingling and numbness sensations.

➢ *Procedure*

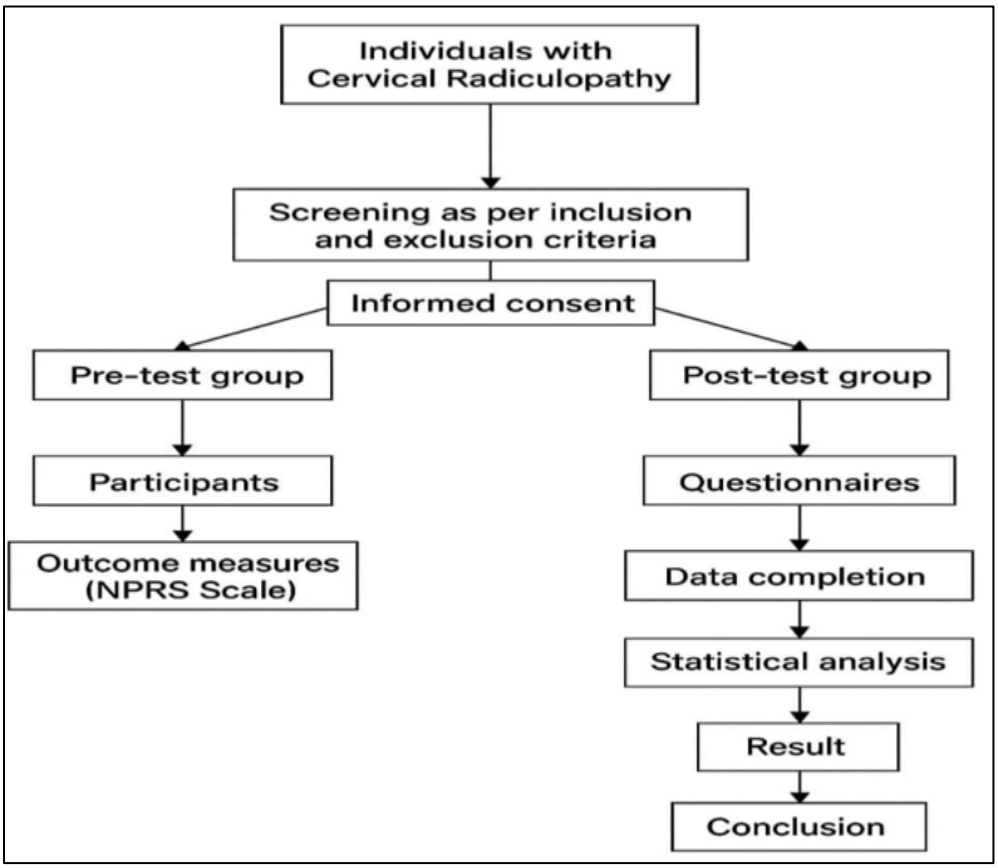

Fig 2 Flow Chart

Participants were initially screened using the Upper Limb Tension Test (ULTT) to identify the presence of neck pain accompanied by tingling or numbness, symptoms commonly associated with cervical radiculopathy. Individuals who tested positive were further evaluated for eligibility based on predetermined inclusion and exclusion criteria. Following confirmation of eligibility, the study protocol was explained to each participant, and written informed consent was obtained prior to their enrolment. Baseline pain assessment was carried out using the Numerical Pain Rating Scale (NPRS) to document the intensity of neck pain before the intervention. These evaluations were performed by a qualified physiotherapist prior to initiating the

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep036

nerve flossing techniques. All interventions were administered with participants seated comfortably in a chair.

Median Nerve Glide: With the arm placed by the side and the palm facing upward, the participant gently flexed the wrist while tilting the head away from the working arm. The position was held for two seconds before returning to the starting posture. This movement was repeated between five and fifteen times.

Ulnar Nerve Glide: The participant extended the arm laterally with the palm facing downward, followed by gradual flexion at the elbow and wrist so that the palm moved toward the side of the face. The posture was maintained for two seconds and then released. The movement was repeated five to fifteen times.

Radial Nerve Glide: With the arm positioned alongside the hip and the palm facing backward, the wrist was flexed while the shoulder was gently extended. Simultaneously, the neck was bent away from the arm. The position was held for two seconds before release and repeated five to fifteen times.

Upon completion of the intervention sessions, post-treatment pain scores were collected using the NPRS. The pre- and post-intervention data were subjected to statistical analysis to determine the therapeutic effectiveness of nerve flossing in individuals diagnosed with cervical radiculopathy.

➢ *Outcome Measures*

To assess the effectiveness of the intervention, two standardized outcome measures were employed both before and after the application of the nerve flossing technique. The Upper Limb Tension Test (ULTT) was administered to identify the specific nerve root involvement associated with neck pain, tingling, and numbness. In addition, the Numerical Pain Rating Scale (NPRS) was used to quantify pain intensity, with participants rating their discomfort on a scale ranging from 0 (indicating no pain) to 10 (representing the worst possible pain). Both assessment tools are well-established in clinical practice and are recognized for their reliability, validity, and relevance in evaluating musculoskeletal pain and functional impairments.

➢ *Data Analysis*

The effectiveness of the intervention was evaluated by comparing pre- and post-treatment scores on the Numerical Pain Rating Scale (NPRS). Statistical analysis using a paired *t*-test revealed a *t* value of 17.381 with a *p* value less than 0.01, indicating a highly significant difference between baseline and post-intervention pain levels. These findings demonstrate that participants reported a marked reduction in pain intensity following the nerve flossing sessions, thereby confirming the effectiveness of the intervention in alleviating symptoms of cervical radiculopathy.

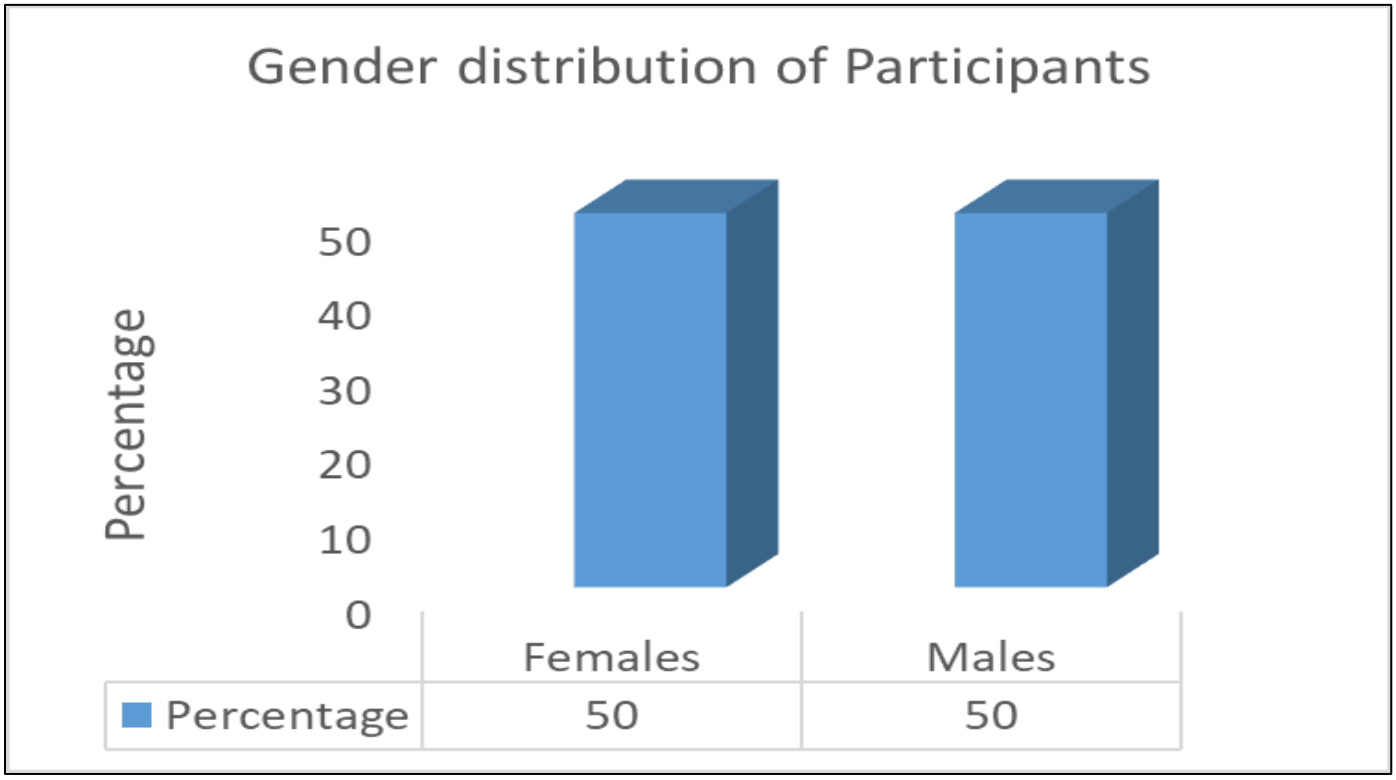

Fig 3 Distribution of Gender

Table 1 Gender Distribution

Gender	Frequency	Percentage
Females	15	50
Males	15	50

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep036

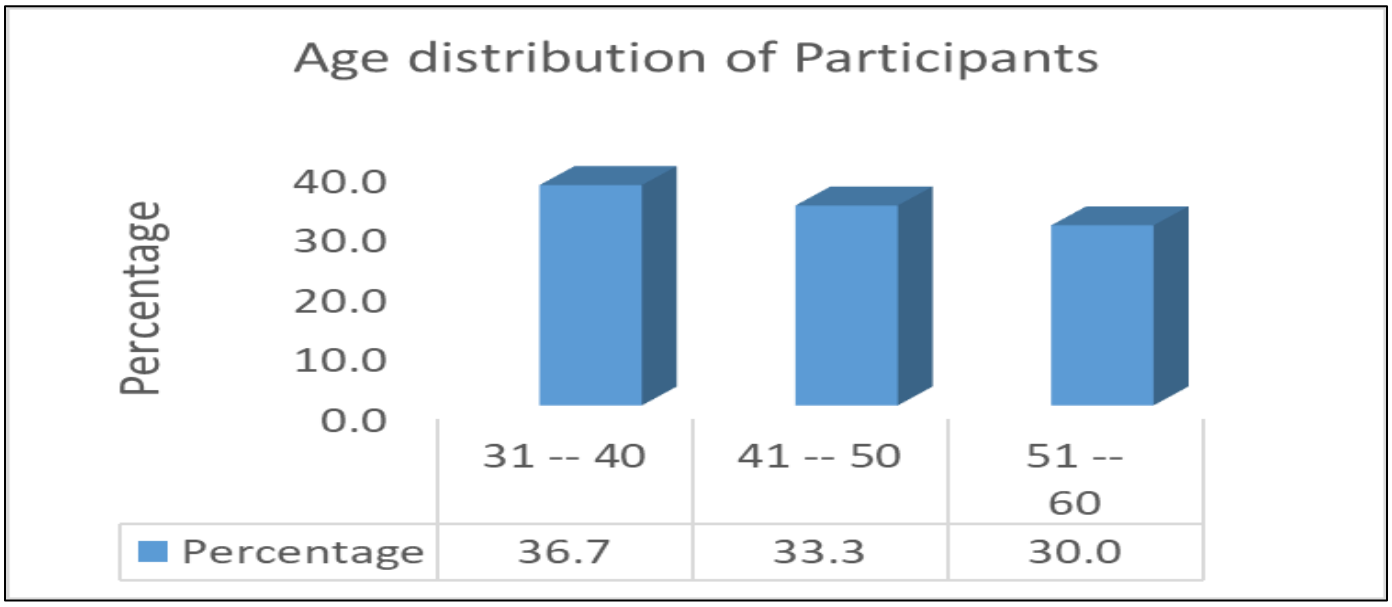

Fig 4 Distribution of Age

Table 2 Age Distribution

Age groups	Frequency	Percentage
31 -- 40	11	36.7
41 -- 50	10	33.3
51 -- 60	9	30.0

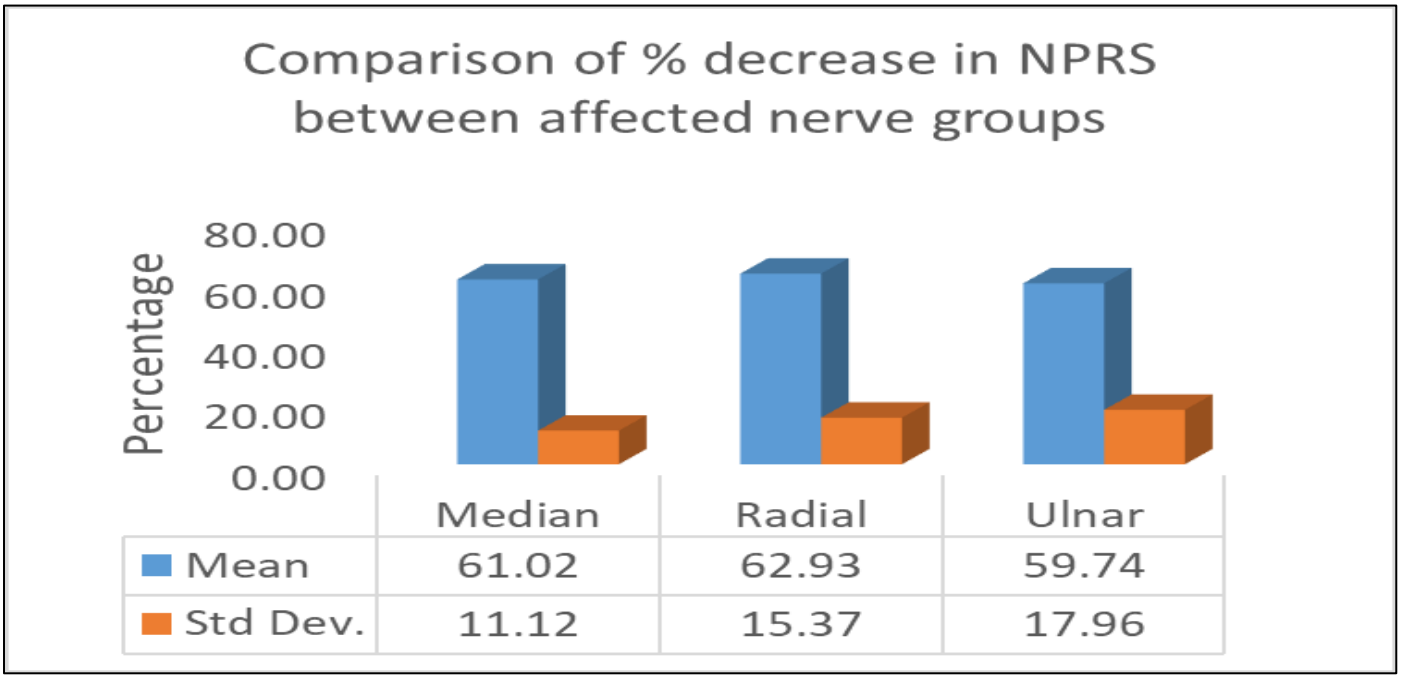

Fig 5 Decrease in NPRS Between Affected Nerve Groups

III. RESULTS

A total of 30 individuals diagnosed with cervical radiculopathy participated in the study, comprising 15 females (50%) and 15 males (50%). The analysis demonstrated a statistically significant effect of the nerve flossing intervention on symptom reduction. Comparison of pre- and post-intervention scores revealed a marked improvement following treatment. Statistical testing yielded a t value of 17.381 with a p value <0.01, confirming that the observed differences were highly significant. All participants were assessed using the Upper Limb Tension Test (ULTT) and the Numerical Pain Rating Scale (NPRS) before and after the intervention. Prior to treatment, the majority of participants reported moderate to severe levels of neck pain, with the average baseline NPRS score indicating considerable discomfort. Post-intervention, a substantial and consistent reduction in pain intensity was observed across the sample.

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep036

Nearly all participants reported immediate relief in pain levels, along with a reduction in tingling and numbness associated with cervical radiculopathy. Analysis of NPRS scores further revealed that neck pain had initially impacted daily activities such as sleeping, concentrating, driving, reading, and working. Following the intervention, participants demonstrated clear functional improvement, reporting reduced disturbance from pain and enhanced ability to perform routine tasks, including turning the head, maintaining comfortable sleep, and focusing at work or study. The immediate reduction in NPRS scores strongly suggests that nerve flossing improved cervical mobility while alleviating pain, tingling, and numbness, thereby enhancing overall functional capacity in individuals with cervical radiculopathy.

IV. DISCUSSION

The present study was conducted to evaluate the effectiveness of the nerve flossing technique in individuals with cervical radiculopathy. The statistical analysis of the data revealed a highly significant improvement following the intervention, with a t-value of 17.381 ($p < 0.01$). This finding suggests that nerve flossing is effective in alleviating symptoms associated with cervical radiculopathy. The results of the present study are consistent with previous research on neurodynamic techniques. Butler first introduced the concept of neural mobilization, emphasizing its role in reducing mechanosensitivity and restoring axoplasmic flow. Shacklock further developed clinical applications of nerve mobilization, demonstrating that nerve sliding techniques could improve pain and mobility in patients with nerve entrapment syndromes. Similarly, Coppieters and Butler[15] highlighted that neural mobilization promotes intraneural circulation, decreases edema, and improves neural tissue health. More recently, study on the same provided evidence that nerve mobilization significantly reduces pain and disability in patients with lumbar radiculopathy. While these studies consistently support the benefits of nerve flossing, the magnitude of improvement reported has often been moderate. For example, Nee et al. and Cleland both demonstrated significant but comparatively modest improvements in pain and function following neural mobilization in patients with radiculopathy. In contrast, the present study reported a much stronger statistical effect, with a t-value of 17.381, far exceeding those previously documented. This suggests that the therapeutic benefits observed in this study were both more pronounced and more reliable, reinforcing the superiority of the intervention protocol used here. The greater effectiveness observed in the present study may be explained by several factors. First, the specific application parameters—such as the frequency, duration, and progression of nerve flossing exercises—were optimized to maximize physiological benefits. By enhancing the sliding and gliding of neural tissue within its surrounding structures, this protocol likely reduced intraneural edema more efficiently, restored axoplasmic flow more completely, and decreased mechanosensitivity more effectively than in prior studies. Second, the focused inclusion of patients with cervical radiculopathy, rather than mixed nerve entrapment conditions, may have contributed to clearer and stronger outcomes. Clinically, these findings hold important implications for physiotherapists and rehabilitation specialists. Nerve flossing is a simple, non-invasive, and cost-effective intervention that can be easily incorporated into standard treatment protocols. While prior studies have supported its use, the present study strengthens the clinical case by providing robust statistical evidence of its superior efficacy. Importantly, the high t-value and strong significance level observed here suggest that nerve flossing not only reduces symptoms but also provides a consistent and replicable improvement across patients. This reinforces its value as a frontline conservative treatment option, potentially reducing the need for pharmacological interventions and delaying or avoiding surgical management. Despite the compelling evidence, certain limitations must be acknowledged. The study may have been influenced by factors such as sample size, short-term follow-up, and the lack of direct comparison with other therapeutic modalities. While the statistical strength of the results is undeniable, future research should focus on larger randomized controlled trials with long-term follow-up to confirm the sustained effectiveness of nerve flossing and to compare its outcomes against other conservative and invasive approaches. In summary, the results of this study strongly suggest that nerve flossing is not only effective but more effective than what has been reported in previous research for cervical radiculopathy. The exceptionally high t-value (17.381) and $p < 0.01$ underscore the reliability of these findings and highlight the superior therapeutic potential of this intervention. These outcomes provide strong support for the routine inclusion of nerve mobilization techniques in physiotherapy practice for patients with cervical radiculopathy.

V. CONCLUSION

This study provides evidence that the nerve flossing technique can significantly reduce pain in individuals with cervical radiculopathy. The intervention was effective across different nerve root involvements and demographic subgroups, suggesting broad clinical applicability. While further research is needed to confirm these findings and explore long-term outcomes, nerve flossing can be recommended as a safe, simple, and cost-effective adjunct to conventional physiotherapy management for cervical radiculopathy.

ABBREVIATIONS

- ULTT: Upper Limb Tension Test
- NPRS: Numerical Pain Rating Scale

REFERENCES

[1]. Lyer S, Kim HJ. Cervical radiculopathy. Curr Rev Musculoskeletal Med. 2016 Sep;9(3):272-80. doi: 10.1007/ s12178-016-9349-4. PMID: 27250042; PMCID: PMC4958381.

[2]. Bono CM, Ghiselli G, Gilbert TJ, Kreiner DS, Reitman C, Summers JT, Baisden JL, Easa J, Fernand R, Lamer T, Matz PG, Mazanec DJ, Resnick DK, Shaffer WO, Sharma AK, Timmons RB, Toton JF; North American

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/25sep036

Spine Society. An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders. Spine J. 2011 Jan;11(1):64-72. doi: 10.1016/j.spinee.2010.10.023. PMID: 21168100.

[3]. Zanwar R, Wani S. Reliability and validity of modified upper limb neurodynamic tests in patients with cervical rad 15. PMID: 30510155; PMSID: PC 10949183:4412): 137-146. doi: 10.114215101370252450012. Epub 2023

[4]. Hamed SA, Zoheiry IM, Waked NM, Saad El-Din Mahmoud L. Effect of Neurodynamics Nerve Flossing on Femoral Neuropathy in Haemophilic Patients: A randomized controlled study. J Musculoskelet Neuronal Interact. 2021 Sep 1;21 (3):379-386. PMID: 34465677; PMCID: PMC8426650.

[5]. Thoomes E, Ellis R, Dilley A, Falla D, Thoomes-de Graaf M. Excursion of the median nerve during a contra-lateral cervical lateral glide movement in people with and without cervical radiculopathy. Musculoskelet Sci Pract. 2021 Apr; 52:102349. doi: 10.1016/j.msksp.2021.102349. Epub 2021 Feb 16. PMID: 33618231.

[6]. Woods BI, Hilibrand AS. Cervical radiculopathy: epidemiology, etiology, diagnosis, and treatment. J Spinal Disord Tech. 2015 Jun;28(5): E251-9. doi: 10.1097/BSD.0000000000000284. PMID: 25985461.

[7]. Corey DL, Comeau D. Cervical radiculopathy. Med Clin North Am. 2014 Jul;98(4):791-9, xii. doi: 10.1016/ j. mcna.2014.04.001. PMID: 24994052.

[8]. Borrella-Andrés S, Marqués-García I, Lucha-López MO, Fanlo-Mazas P, Hernández-Secorún M, Pérez-Bellmunt A, Tricás-Moreno JM, Hidalgo-García C. Manual Therapy as a Management of Cervical Radiculopathy: A Systematic Review. Biomed Res Int. 2021 Jun 3; 2021:9936981. doi: 10.1155/2021/9936981. PMID: 34189141; PMCID: PMC8195637.

[9]. Maharaj RG, Motilal S, Khan R, Rampersad F. A No-Cost, Bedside, Self-Traction Maneuver for Relief from Chronic Cervical Radiculopathy: A Case Report. Cureus. 2023 Aug 23;15(8): e43963. doi: 10.7759/cureus.43963. PMID: 37746470; PMCID: PMC10515476.

[10]. 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. [PMC free article] [PubMed]

[11]. Hassan KZ, Sherman AL. Stat Pearls [Internet]. Stat Pearls Publishing; Treasure Island (FL): Jul 17, 2023. Epidural Steroids. [PubMed]

[12]. Saranga J, Green A, Lewis J, Worsfold C. Effect of a cervical lateral glide on the upper limb neurodynamic test 1: A blinded placebo-controlled investigation. Physiotherapy. 2003;89(11):678-684. 13. Elvey R, Hall T. Neural tissue evaluation and treatment. In: Donatelli R, ed. Physical therapy of the shoulder. 4 ed. St. Louis: Churchill Livingstone; 2004:187-203.

[13]. Walsh MT. Upper limb neural tension testing and mobilization. Fact, fiction, and a practical approach. J Hand Ther. 2005;18(2):241-258

[14]. Butler DS. The Sensitive Nervous System. Adelaide, Australia: Noigroup Publications; 2000. [Google Scholar].