

Original Article

Comparative Effects of Nerve Flossing and Cox Technique in Sciatica

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ABSTRACT

Background: Sciatica is a prevalent condition characterized by pain that radiates along the path of the sciatic nerve, affecting a significant portion of the adult population at some point in their lives. Traditional treatment modalities have varied in effectiveness, prompting the exploration of alternative therapies such as Nerve Flossing Technique (NFT) and Cox Technique (CT). This study aims to compare the efficacy of these two non-invasive treatments in alleviating the symptoms of sciatica.

Objective: The primary objective of this study was to evaluate and compare the effects of Nerve Flossing Technique and Cox Technique on reducing pain and improving functional disability in patients with sciatica.

Methods: This randomized controlled trial was conducted at the outpatient department of physiotherapy in Allied Hospital and District Head Quarter Hospital, Faisalabad. Forty-two patients with sciatica were randomly assigned to either Group A (NFT group) or Group B (CT group) and received the interventions for six weeks, with four sessions per week. Each session included a conventional treatment of hot pack application, TENS, and stretching exercises for 15 minutes, followed by the respective group's technique. Pain intensity was measured using the Numeric Pain Rating Scale (NPRS), and functional disability was assessed with the Modified Oswestry Disability Index (MODI) before and after the intervention period.

Results: Both groups showed significant improvements in pain and functional disability post-treatment. Group A (NFT) exhibited a reduction in NPRS scores from a median of 7 to 2 and an improvement in MODI scores from 52.167 ± 5.13 to 22.77 ± 4.30 , indicating a mean difference of 29.38 ± 4.57 ($p < 0.05$). Group B (CT) showed a reduction in NPRS scores from a median of 7 to 5 and an improvement in MODI scores from 53.61 ± 5.30 to 41.05 ± 10.26 , with a mean difference of 12.55 ± 7.67 ($p < 0.05$). The between-group comparison revealed a more significant improvement in Group A in terms of both NPRS and MODI scores ($p < 0.05$).

Conclusion: The study concluded that both Nerve Flossing Technique and Cox Technique are effective in reducing pain and improving functional disability in patients with sciatica. However, the Nerve Flossing Technique demonstrated a significantly greater improvement compared to the Cox Technique, making it a more favorable non-invasive treatment option for sciatica.

Keywords: Sciatica, Nerve Flossing Technique, Cox Technique, Pain, Functional Disability, Physiotherapy.

INTRODUCTION

The comparative effects of nerve flossing and the Cox technique in the treatment of sciatica present an interesting area of study within the domain of physical therapy and chiropractic care (1, 2). The sciatic nerve, being the largest and thickest nerve in the body, originates from the lumbosacral plexus and extends down to the lower limb, providing sensory and motor functions (1, 3). Sciatica, characterized by pain, numbness, and weakness along the distribution of the sciatic nerve, is a common condition affecting a significant portion of the population. Its prevalence and impact on quality of life underscore the importance of effective treatment modalities (4).

Nerve flossing, also known as neural mobilization, and the Cox flexion-distraction technique are two non-surgical interventions aimed at alleviating sciatic symptoms. Nerve flossing involves specific movements designed to mobilize the sciatic nerve, promoting flexibility and reducing nerve tension. This technique is based on the premise that movement can facilitate neural repair and reduce symptoms associated with nerve compression or irritation (5). Studies have shown that nerve flossing, when combined with

conventional physical therapy, can significantly improve hip flexion range of motion and reduce pain intensity in patients with acute sciatica (6). The technique's effectiveness is attributed to its ability to facilitate neural mobility and reduce intraneural pressure.

On the other hand, the Cox technique, a form of spinal manipulation, utilizes a specialized table to apply flexion-distraction and decompression to the lumbar spine. This method aims to increase intervertebral disc height, reduce pressure on the spinal nerves, and improve spinal joint mobility. The technique has been particularly beneficial for patients with disc herniations and lumbar spinal stenosis, offering pain relief and functional improvement (7). The Cox technique's pain-relieving effects are thought to stem from its ability to decompress the spinal nerves and improve spinal biomechanics, thereby reducing the inflammatory response associated with sciatica.

Comparative studies between nerve flossing and the Cox technique are sparse, making it difficult to definitively conclude which method is superior for treating sciatica. However, evidence suggests that both interventions can be effective in managing sciatic symptoms, depending on the patient's specific condition and the underlying cause of their sciatica. For instance, nerve flossing may be more suited for patients with peripheral nerve entrapments, while the Cox technique might be preferred for those with central spinal stenosis or disc-related issues.

The choice between nerve flossing and the Cox technique should be based on a thorough clinical evaluation, including the patient's history, physical examination findings, and diagnostic imaging results. A personalized treatment plan, considering the patient's specific needs and preferences, can optimize outcomes. Additionally, combining these techniques with other conservative treatments, such as exercises, heat therapy, and ergonomic adjustments, may enhance their effectiveness.

Both nerve flossing and the Cox technique offer valuable non-surgical options for treating sciatica, with each method having its unique mechanisms of action and indications. Further research, particularly randomized controlled trials comparing these two interventions, is needed to establish clearer guidelines for their application in clinical practice. This would enable healthcare professionals to make informed decisions when treating patients with sciatica, ultimately improving patient outcomes and quality of life.

MATERIAL AND METHODS

This study was designed as a randomized controlled trial to compare the effects of nerve flossing and the Cox technique on disability and pain in patients with sciatica. The research was conducted in the physical therapy outpatient departments of Allied Hospital and District Head Quarter Hospital in Faisalabad. Utilizing the Raosoft online calculator, the sample size was determined to be 42 participants. A purposive sampling technique was employed to select the study population, and the data collection spanned approximately four months following the approval of the research synopsis (8).

A total of 42 patients who met the inclusion criteria were selected and then randomly assigned into two groups, A and B, with 21 participants in each group. The inclusion criteria targeted individuals aged 30 to 60 years who exhibited positive Straight Leg Raise (SLR) & Slump tests with reproduction of neurological symptoms such as radiating leg pain with tingling sensations and who provided informed consent. Exclusion criteria were set to omit participants with lumbar spine pathologies like spondylolisthesis, fracture, mild ligament injury, degenerative disc disease, psychosomatic or psychological diseases, serious co-morbidities, congenital anomalies of the nervous system, or those requiring immediate surgical intervention (9).

The experimental research aimed to investigate the comparative effects of Nerve Flossing Technique (NFT) and Cox technique on disability and pain in sciatica patients. The study was meticulously carried out in the physical therapy outpatient departments of Allied Hospital and District Head Quarter Hospital, Faisalabad. Participants were given detailed information about the study and signed informed consent forms before inclusion. The enrolled participants were allocated into two groups through a randomization process, ensuring an unbiased distribution (10).

For the treatment protocol, both groups received conventional physical therapy, including TENS, and stretching exercises, for ten minutes. Following this, Group A underwent the Nerve Flossing Technique (NFT) for fifteen repetitions in three sets with five-minute rest intervals between each set, across four sessions per week (11, 12). The NFT was performed actively with participants seated, combining movements of neck flexion and extension of the target lower extremity's knee. As sensitivity decreased, participants intensified the stretching by dorsiflexing the ankle and extending the toes upwards. In contrast, Group B received the Cox technique, administered through flexion-distraction manipulation on the lumbar spinous processes, using a specialized table to perform flexion-distraction movements for 20 seconds in three sets of three repetitions.

Outcome measures focused on assessing pain using the Numeric Pain Rating Scale (NPRS) (13) and disability through the Modified Oswestry Disability Index (MODI) (14). The NPRS, an 11-point scale ranging from 0 (no pain) to 10 (maximum pain), allowed participants to rate their pain intensity. The MODI evaluated the functional impairment on a scale of 0 to 5 for ten items, with the total score converted to a percentage, serving as a reliable measure for determining the level of disability (15).

Data was analyzed using the Statistical Package for Social Sciences (SPSS) for Windows, version 26. The significance level was established at $P=0.05$ to determine the statistical significance of the findings. Ethical considerations were strictly adhered to throughout the study, ensuring no harm came to participants, prioritizing their privacy, and obtaining informed consent in accordance with the Declaration of Helsinki.

RESULTS

In this randomized controlled trial, the demographic distribution of participants was meticulously analyzed, with a total of 36 individuals evenly split into two groups, A and B, each comprising 18 participants. The age distribution revealed that in Group A, 55.55% (10 individuals) were aged between 30-45 years, whereas 44.44% (8 individuals) fell into the 46-60 years category. Conversely, Group B displayed a slightly different age composition with 38.89% (7 individuals) in the 30-45 years range and a higher proportion, 61.11% (11 individuals), in the 46-60 years bracket. This demographic setup indicated a diverse age representation across both groups, reflecting a broad spectrum of the adult population affected by sciatica (Table 1).

Gender distribution was identical in both groups, with males constituting 61.11% (11 individuals) and females 38.89% (7 individuals) of each group, culminating in a total of 22 males and 14 females participating in the study. This gender distribution underscores the prevalence of sciatica across both sexes, albeit with a slight male predominance in this sample (Table 1).

Regarding the participants' occupations, a varied spectrum was observed. Shopkeepers represented 30.55% of the total population, with a slightly higher presence in Group B (33.33%) compared to Group A (27.78%). Business persons and housewives followed, contributing to 19.44% and 25% of the total cohort, respectively. The representation of sports persons and IT-workers was comparatively lower, accounting for 11.11% and 13.89% of the total participants, illustrating the cross-sectional impact of sciatica across various occupational domains (Table 2).

Table 1 Demographic Distribution

Demographic	Group A (n=18)	Group B (n=18)	Total (n=36)
Age 30-45	10 (55.55%)	7 (38.89%)	17 (47.22%)
Age 46-60	8 (44.44%)	11 (61.11%)	19 (52.78%)
Gender- Male	11 (61.11%)	11 (61.11%)	22 (61.11%)
Gender- Female	7 (38.89%)	7 (38.89%)	14 (38.89%)

Table 2 Occupation

Occupation	Group A (n=18)	Group B (n=18)	Total (n=36)
Shopkeepers	5 (27.78%)	6 (33.33%)	11 (30.55%)
Business person	4 (22.22%)	3 (16.67%)	7 (19.44%)
Housewife	4 (22.22%)	5 (27.78%)	9 (25%)
Sports person	2 (11.11%)	2 (11.11%)	4 (11.11%)
IT-worker	3 (16.67%)	2 (11.11%)	5 (13.89%)

Table 3 Numeric Pain Rating Scale (NPRS)

Study Groups	Negative Ranks	Positive Ranks	Ties	Total	N	Z	Asymptotic Significance (2-tailed)
Group A	18	0	0	18	18	-3.769	.000
Group B	15	0	3	18	18	-3.447	.001

Table 4 Between Group Analysis of NPRS (Mann Whitney test)

Variables	Group A	Group B	Mean Rank	Median	Sum of Rank	Z	SIG
Pre-NPRS	18	18	19.25 / 17.75	7.00	346.50 / 319.50	-0.447	0.655
Post-NPRS	18	18	10.08 / 26.92	2.00 / 5.00	181.50 / 484.50	-4.893	.000

Table 5 Modified Oswestry Disability Index (MODI)

Study Group	Pre-MODI Mean \pm SD	Post-MODI Mean \pm SD	Mean Difference	P-value
Group A	52.167 \pm 5.13	22.77 \pm 4.30	29.38 \pm 4.57	.000
Group B	53.61 \pm 5.30	41.05 \pm 10.26	12.55 \pm 7.67	.000

Table 6 Between Group Analysis of MODI (Independent t-test)

Variable	Group A (NFT) Mean±SD	Group B (CT) Mean±SD	Mean Difference	P-value (2-tailed)
MODI-PRE	52.167±5.13	53.61±5.30	-1.44	0.412
MODI-POST	22.77±4.30	41.05±10.26	-18.27	.000

The effectiveness of the treatments was evaluated using the Numeric Pain Rating Scale (NPRS) and the Modified Oswestry Disability Index (MODI). The within-group analysis of NPRS revealed significant pain reduction in both groups, with Group A showing a marked improvement, as evidenced by a unanimous negative rank across all 18 participants and an asymptotic significance of .000. Group B also demonstrated significant pain alleviation, albeit with three ties alongside the 15 negative ranks, indicating a slightly less uniform but still substantial response to treatment (Table 3). The between-group analysis further highlighted this disparity, with post-treatment NPRS mean ranks significantly lower in Group A compared to Group B, underscoring the differential impact of the interventions (Table 4).

The MODI assessment further enriched the findings, with Group A showing a remarkable mean difference of 29.38 ± 4.57 in disability scores pre to post-treatment, asserting the substantial efficacy of the treatment. Group B, while also showing improvement, had a lesser mean difference of 12.55 ± 7.67 , suggesting varying degrees of responsiveness to the respective interventions (Table 5). The between-group analysis of MODI post-treatment scores starkly emphasized the superior efficacy of the treatment in Group A over Group B, with a significant mean difference highlighting the potential of the Nerve Flossing Technique in mitigating disability associated with sciatica more effectively than the Cox Technique (Table 6).

DISCUSSION

The conducted study, entitled "Comparative Effects of Nerve Flossing and Cox Technique in Sciatica," took place in the outpatient department of physiotherapy at Allied Hospital and District Head Quarter Hospital, Faisalabad. This research involved forty-two subjects who underwent selected interventions for six weeks, encompassing twenty-four treatment sessions. The participants were divided into two distinct groups: Group A, which received the Nerve Flossing Technique (NFT) alongside conventional therapy, and Group B, which was treated with the Cox Technique (CT) in addition to the conventional therapy. The conventional treatment comprised a fifteen-minute session of hot packs, Transcutaneous Electrical Nerve Stimulation (TENS), and stretching exercises, with each stretch held statically for ten seconds. This foundational treatment was followed by the specific interventions tailored to each group.

The findings from this study have indicated that both NFT and Cox flexion distraction manipulation significantly benefit patients by alleviating pain and improving functional disability in the management of sciatica, with p-values indicating statistical significance (<0.05). These outcomes align with the systematic review conducted by Mubushara Afzal et al. in 2022, which underscored the efficacy of NFT in adult patients with sciatica, highlighting its role in reducing pain and impairment and enhancing the hip joint's range of motion (16). Similarly, a randomized controlled study by M. Raja Srinivas et al. in 2022 demonstrated that NFT, when used in conjunction with conventional therapy, surpasses older therapy methods alone in mitigating pain, paresthesia, and restoring mobility and physical functioning in patients with subacute sciatica (17).

The study's outcomes also resonate with a case study by Ralph A. Kruse DC et al. in 2019, where Cox FD manipulative technique was utilized in treating lumbar radiculopathy with spondylolisthesis, further substantiating the efficacy of Cox FDM as a viable nonsurgical treatment option (18). However, contrasting findings were observed in the study by Muhammad Usman Riaz et al. in 2020, which compared spinal mobilization with leg movement against the neurodynamic sliding technique, suggesting superior outcomes of spinal mobilization over neurodynamic sliding in managing radicular pain (19).

The current study's results also concur with the investigation by Himani Sanjay Vartak et al. in 2019, which compared nerve mobilization with the nerve flossing technique, demonstrating that both modalities are effective in sciatica management, with nerve flossing alongside conventional therapy emerging as a more effective management strategy (20).

While the current study provides substantial evidence supporting the effectiveness of NFT and Cox flexion distraction manipulation in sciatica treatment, it also acknowledges its limitations, including a confined sample size to patients from selected hospitals, excluding patients with sciatica due to fractures or other deformities, and the inability to generalize results due to the small sample size and short study duration.

To enhance the generalizability and applicability of these findings, future research should be conducted with larger sample sizes and include a broader range of sciatica causes. It is recommended that NFT be explored in combination with various therapeutic options to maximize treatment efficacy. Further studies in this domain will contribute to evidence-based practice, enriching the physiotherapeutic management of sciatica and potentially extending its benefits to diverse patient populations, including athletes.

CONCLUSION

In conclusion, the study substantiates that both Nerve Flossing Technique and Cox Technique significantly reduce pain and improve functional disability in sciatica management. Notably, the Nerve Flossing Technique demonstrated more pronounced results, suggesting its potential superiority in enhancing treatment outcomes for sciatica patients. This research not only contributes to the body of knowledge in physiotherapy but also provides a foundation for future investigations aimed at refining sciatica management strategies.

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