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Effectiveness of Interferential Therapy on Pain and Functional Disability in Patients with Cervical Spondylosis

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Abstract

Background: Cervical spondylosis is a common degenerative disorder of the cervical spine characterised by neck pain, stiffness, and functional limitation. Interferential Therapy (IFT) is a non-invasive electrotherapeutic modality that uses medium-frequency currents to produce analgesic effects, improve circulation, reduce muscle spasm, and support functional recovery.

Objectives: To evaluate the effectiveness of Interferential Therapy on pain intensity, functional disability, and selected domains of quality of life in patients with cervical spondylosis.

Materials and Methods: A single-group pre–post interventional study was conducted on 10 participants who fulfilled the inclusion criteria. IFT was applied to the cervical region for 20 minutes daily for 10 consecutive days. Outcomes were assessed before and after the intervention using the Visual Analogue Scale (VAS), Neck Disability Index (NDI), and Short Form-36 (SF-36) Health Survey. Data were analysed using paired samples t-tests.

Results: Mean VAS score decreased significantly from 5.10 ± 0.74 to 2.00 ± 0.94 ($p < 0.001$). Mean NDI score decreased from 31.34 ± 15.51 to 9.65 ± 7.42 ($p < 0.001$). SF-36 showed statistically significant improvements in the Physical Functioning and General Health domains; other domains improved but did not reach statistical significance.

Conclusion: Interferential Therapy is an effective conservative modality for reducing pain and functional disability and for improving selected physical domains of quality of life in patients with cervical spondylosis. Larger controlled trials are recommended.

Keywords: *Cervical spondylosis; Interferential Therapy; neck pain; Visual Analogue Scale; Neck Disability Index; SF-36; electrotherapy*

1. Introduction

Cervical spondylosis is a common degenerative condition of the cervical spine and one of the leading causes of neck pain and disability worldwide [1]. It involves age-related degenerative changes in the intervertebral discs, vertebral bodies, facet joints, and supporting ligaments, resulting in pain, stiffness, reduced range of motion, muscle spasm, and functional limitation [1,2]. Although traditionally associated with advancing age, the condition is increasingly observed in younger individuals because of prolonged computer and smartphone use, forward-head posture, sedentary lifestyle, and occupational strain [4,5].

Radiological degenerative changes are present in approximately 25% of individuals under 40 years, 50% over 40 years, and nearly 85% over 60 years, with C5–C6 and C6–C7 the most frequently involved levels [1]. Clinical presentations range from axial neck pain to radiculopathy and, in advanced cases, myelopathy [9]. Conventional management prioritises conservative measures—physiotherapy, analgesics, posture correction, and lifestyle modification—reserving surgery for progressive neurological deficit [14–18].

Interferential Therapy (IFT) is a widely used electrotherapeutic modality that delivers two medium-frequency alternating currents which intersect within the tissues to produce a low-frequency beat effect [19]. The resulting stimulation is thought to modulate pain via gate-control mechanisms and endogenous opioid release, improve local circulation, reduce muscle spasm and oedema, and facilitate tissue recovery [19–22]. Clinical surveys and systematic reviews support its analgesic efficacy in musculoskeletal pain, including neck disorders [20,21,23].

Despite extensive clinical use, focused evidence on a short-course IFT protocol specifically for cervical spondylosis, using validated measures of pain, disability, and quality of life, remains limited. The present study therefore evaluated the effect of a 10-day IFT regimen on pain intensity (VAS), functional disability (NDI), and health-related quality of life (SF-36) in patients with cervical spondylosis.

2. Aims and Objectives

Aim: To evaluate the effectiveness of Interferential Therapy on pain and functional disability in patients with cervical spondylosis.

Objectives:

1. To assess change in pain intensity using the Visual Analogue Scale (VAS) before and after IFT.
2. To assess change in functional disability using the Neck Disability Index (NDI).
3. To evaluate change in health-related quality of life using the SF-36 Health Survey.

3. Review of Literature

Cervical spondylosis is a multifactorial degenerative process driven by disc desiccation, osteophyte formation, facet arthropathy, and ligamentous thickening [1,8]. Mechanical overload from sustained postures and repetitive neck movements accelerates the process [4,5]. Clinical syndromes include axial

pain, radiculopathy, and myelopathy [9]. Diagnosis rests on clinical examination supported by plain radiography and, when neurological features are present, MRI [12,13].

IFT produces a low-frequency therapeutic effect deep within tissues while minimising cutaneous discomfort [19]. Proposed mechanisms include gate-control analgesia, improved microcirculation, reduction of oedema, and motor stimulation that may decrease spasm [19,22,26]. Systematic reviews and clinical trials support its analgesic benefit in musculoskeletal pain [23,24,28]. The Neck Disability Index and SF-36 are validated instruments widely used to quantify functional and quality-of-life outcomes in neck disorders [29,31].

4. Materials and Methods

4.1 Study Design and Setting

A single-group, pre-test/post-test interventional study was conducted at Tapovana Medical College of Naturopathy and Yogic Sciences, Doddabathi, Davangere, Karnataka.

4.2 Participants

Ten participants diagnosed with cervical spondylosis who fulfilled the inclusion criteria were enrolled. All completed the 10-day protocol with no dropouts.

Inclusion criteria:

- Clinical diagnosis of cervical spondylosis with neck pain and functional limitation
- Willingness to provide written informed consent and attend daily sessions
- Ability to complete VAS, NDI, and SF-36 assessments

Exclusion criteria:

- Acute trauma, fracture, or recent cervical surgery
- Pacemaker, malignancy in the treatment area, or other contraindications to electrotherapy
- Severe myelopathy requiring urgent surgical evaluation

4.3 Ethical Considerations

The study was conducted after institutional approval. Written informed consent was obtained from all participants. Participation was voluntary and confidentiality was maintained.

4.4 Intervention

Interferential Therapy was administered to the cervical region for 20 minutes once daily for 10 consecutive days. Standard electrode placement and clinically appropriate frequency and intensity parameters were used under supervision, with continuous monitoring of patient comfort and safety.

4.5 Outcome Measures

Visual Analogue Scale (VAS): A 0–10 scale quantifying pain intensity [30].

Neck Disability Index (NDI): A validated 10-item questionnaire measuring neck-related functional disability; higher scores indicate greater disability [29].

Short Form-36 (SF-36) Health Survey: A generic quality-of-life instrument assessing eight domains (Physical Functioning, Role-Physical, Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional, Mental Health) [31,34].

4.6 Statistical Analysis

Data were expressed as mean ± standard deviation. Pre- and post-intervention scores were compared using the paired samples t-test. A p-value < 0.05 was considered statistically significant. Analyses were performed with appropriate statistical software.

5. Results

All 10 participants completed the intervention with no reported adverse events.

5.1 Pain and Functional Disability

Table 1 presents the pre- and post-intervention VAS and NDI scores.

Outcome	Pre (Mean ± SD)	Post (Mean ± SD)	t-value	p-value
VAS (0–10)	5.10 ± 0.74	2.00 ± 0.94	8.188	<0.001
NDI	31.34 ± 15.51	9.65 ± 7.42	6.244	<0.001

Table 1. Comparison of pre- and post-intervention VAS and NDI scores (n = 10)

Both pain intensity and functional disability showed highly significant reductions following the 10-day IFT protocol.

5.2 Quality of Life (SF-36)

Table 2 summarises the SF-36 domain scores.

SF-36 Domain	Pre (Mean ± SD)	Post (Mean ± SD)	t-value	p-value	Result
Physical Functioning	77.00 ± 8.23	94.50 ± 5.50	-5.093	<0.001	Significant
Role Physical	87.50 ± 13.18	97.50 ± 7.91	-1.809	0.104	NS
Role Emotional	93.75 ± 10.62	96.60 ± 10.75	-0.543	0.600	NS
Vitality	54.50 ± 7.62	52.50 ± 8.25	0.629	0.545	NS
Mental Health	71.20 ± 5.59	70.80 ± 7.79	0.111	0.914	NS
Social Functioning	70.00 ± 10.54	73.75 ± 3.95	-1.152	0.279	NS
Bodily Pain	60.75 ± 11.61	71.50 ± 12.37	-1.799	0.106	NS
General Health	49.50 ± 11.89	65.00 ± 4.08	-3.832	0.004	Significant

Table 2. Comparison of pre- and post-intervention SF-36 domain scores (n = 10; NS = not significant)

Significant improvements were confined to the Physical Functioning and General Health domains. Changes in the remaining domains, although directionally favourable in most cases, did not reach statistical significance, possibly reflecting the short intervention period and limited sample size.

6. Discussion

The present study demonstrated that a 10-day course of Interferential Therapy produced highly significant reductions in pain intensity (VAS) and functional disability (NDI) in patients with cervical spondylosis. Quality-of-life gains were statistically significant for Physical Functioning and General Health, consistent with an immediate effect on physical rather than psychosocial domains.

These findings align with the established analgesic mechanisms of IFT—activation of large-diameter afferent fibres (gate control), possible endogenous opioid release, improved local perfusion, and reduction of muscle spasm [19,22,26]. Prior systematic reviews and clinical trials have similarly reported meaningful pain relief with interferential current in musculoskeletal conditions [23,24,28]. The parallel improvement in NDI indicates that pain reduction translated into better performance of daily activities involving the neck.

Limitations include the small sample size (n = 10), absence of a control or comparator group, short treatment duration, lack of long-term follow-up, and single-centre design. Psychological and social SF-36 domains may require longer interventions to show measurable change. Future randomised controlled trials with larger samples, extended follow-up, and comparison with other physiotherapy modalities are warranted.

Nevertheless, the magnitude of change in pain and disability, the favourable safety profile, and the practicality of the protocol support IFT as a useful conservative option in the short-term management of cervical spondylosis.

7. Conclusion

Within the limitations of this single-group pre–post study, Interferential Therapy administered daily for 10 days significantly reduced pain intensity and functional disability and improved the Physical Functioning and General Health domains of quality of life in patients with cervical spondylosis. The modality is non-invasive, well tolerated, and clinically practical. Larger controlled trials are recommended to confirm these findings and to evaluate longer-term outcomes.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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