

Effect of Electroacupuncture on Pain Intensity, Pain Quality and Quality of Life in Mild to Moderate Cervical Spondylosis: A Pre–Post Interventional Study

Dr. Sandeep S.¹, Aishwarya S.²

¹BNYS, MD, (PhD), HOD, Department of Research Methodology and Recent Advances; Department of Clinical Naturopathy

Government Nature Cure and Yoga Medical College & Hospital (GNCYMCH), Mysore, Karnataka, India.

² Final Year BNYS Students (GNCYMCH), Mysore
(Affiliated to Rajiv Gandhi University of Health Sciences, Karnataka)

Abstract

Background: Cervical spondylosis is a common degenerative condition that produces neck pain, radicular symptoms and functional limitation. Electroacupuncture combines traditional needling with controlled electrical stimulation and is used as a non-pharmacological option for musculoskeletal pain, but short-course protocols evaluated with multidimensional pain and quality-of-life measures remain limited.

Objectives: To evaluate the effect of a 10-day electroacupuncture protocol on pain intensity, pain quality and quality of life in subjects with mild to moderate cervical spondylosis.

Materials and Methods: A single-group pre–post pilot study was conducted on 10 participants (6 male, 4 female; mean age 48.8 ± 3.3 years) with mild to moderate cervical spondylosis at GNCYMC&H, Mysuru. Participants received electroacupuncture daily for 10 days at selected cervical and related points. Outcomes were Visual Analogue Scale (VAS) for pain, Pain Quality Assessment Scale (PQAS) and a Quality of Life Questionnaire (QOLQ), assessed on Day 1 and Day 10. Data were analysed using Wilcoxon signed-rank and paired t-tests; effect sizes were expressed as Cohen's d. Lower scores on all scales indicated improvement.

Results: Highly significant improvements were observed on all outcomes. VAS decreased from 8.70 ± 1.42 to 5.30 ± 1.34 ($\Delta -3.40$, $p = 0.002$, $d = -3.52$). PQAS decreased from 70.60 ± 8.45 to 52.56 ± 6.40 ($\Delta -18.04$, $p = 0.002$, $d = -5.45$). QOLQ decreased from 81.60 ± 9.00 to 64.20 ± 8.12 ($\Delta -17.40$, $p = 0.002$, $d = -6.72$). All 10 participants improved on every measure.

Conclusion: A 10-day course of electroacupuncture was associated with statistically significant and clinically substantial reductions in pain intensity, pain quality burden and quality-of-life impact in subjects with mild to moderate cervical spondylosis. Larger controlled trials are warranted.

Keywords: Cervical spondylosis; Electroacupuncture; VAS; Pain Quality Assessment Scale; Quality of life; Neck pain; Naturopathy; Pre–post study

1. Introduction

Cervical spondylosis is a degenerative disorder of the cervical spine characterised by disc desiccation, osteophyte formation, facet and uncinat joint changes, and variable compression or irritation of neural structures [1,2]. Cervical spondylotic radiculopathy (CSR) accounts for a large proportion of symptomatic cases and typically presents with neck and arm pain, paraesthesia, sensory change and restricted cervical movement [1,3]. Incidence rises with age; occupational neck loading, prior injury and lifestyle factors contribute to the clinical burden [4,5].

Conservative care remains first-line for most patients and may include analgesics, muscle relaxants, physical therapy and, in selected cases, interventional procedures. Limitations of purely pharmacological approaches and patient preference for non-drug options have sustained interest in complementary modalities. Acupuncture has been reported to reduce pain and improve function in cervical disorders; electroacupuncture adds adjustable low-frequency electrical stimulation to classical needling and has been applied in musculoskeletal pain syndromes [6–8]. Proposed mechanisms include modulation of local and central nociceptive pathways, anti-inflammatory signalling and effects on muscle tone.

Despite growing use, short-course electroacupuncture protocols specifically evaluated with multidimensional pain and quality-of-life instruments in mild to moderate cervical spondylosis remain relatively few. The present pilot study evaluated a 10-day electroacupuncture protocol on pain intensity (VAS), pain quality (PQAS) and quality of life in this population.

2. Aims and Objectives

Primary objective: To evaluate the effect of electroacupuncture on pain intensity in subjects with mild to moderate cervical spondylosis.

Secondary objectives: To assess changes in pain quality (PQAS) and quality of life (QOLQ); and to compare pre- and post-intervention scores on all three instruments.

3. Materials and Methods

3.1 Study design and setting

A single-group pre–post pilot study was conducted at Government Nature Cure and Yoga Medical College & Hospital (GNCYMC&H), Mysuru, Karnataka, India.

3.2 Participants

Ten participants (6 male, 4 female; mean age 48.8 ± 3.3 years; range 42–53) with clinically diagnosed mild to moderate cervical spondylosis were enrolled after written informed consent. All completed the 10-day protocol.

Inclusion criteria: Mild to moderate cervical spondylosis; presence of neck pain with or without radicular features; ability to undergo electroacupuncture; willingness to provide informed consent.

Exclusion criteria: Severe neurological deficit requiring urgent surgical evaluation; acute infection or skin lesion at needle sites; pacemaker or contraindication to electrical stimulation; recent cervical surgery or injection; inability to comply with the protocol.

3.3 Intervention

Participants received electroacupuncture daily for 10 days. Needles were placed at selected cervical and related points commonly used for neck pain and radiculopathy (including points such as GV14, GB20, GB21, LI11, TE5/SJ5, SI3, BL10 and paravertebral points as per institutional practice). Electrical stimulation was applied with adjustable low-frequency parameters within patient tolerance. Session duration and intensity were individualised for comfort and safety. Concurrent conventional medication, if any, was continued as advised by the treating physician.

3.4 Outcome measures

Assessments were performed on Day 1 (pre-intervention) and Day 10 (post-intervention):

- Visual Analogue Scale (VAS) for pain (higher = more pain; lower post-score = improvement).
- Pain Quality Assessment Scale (PQAS) (higher = greater pain-quality burden; lower post-score = improvement).
- Quality of Life Questionnaire (QOLQ) (in this dataset, lower scores were interpreted as reduced impact / improvement, consistent with the direction of VAS and PQAS change).

3.5 Statistical analysis

Descriptive statistics (mean, SD, median, minimum, maximum) were calculated. Normality of difference scores was assessed with the Shapiro–Wilk test. Wilcoxon signed-rank test was the primary inferential test; paired t-tests are reported for completeness. Effect size was Cohen’s d (paired). Two-tailed $\alpha = 0.05$. Analyses performed in Python (SciPy/NumPy).

4. Results

All 10 participants (6 male, 4 female; mean age 48.8 ± 3.3 years) completed the intervention.

4.1 Descriptive and inferential statistics

Table 1. Descriptive statistics (n = 10)

Outcome	Time	Mean	SD	Median	Min	Max
VAS Pain	Pre	8.70	1.42	8.0	7.0	11.0
	Post	5.30	1.34	5.5	3.0	7.0
PQAS	Pre	70.60	8.45	72.8	59.5	83.5
	Post	52.56	6.40	53.2	43.7	65.5
QOLQ	Pre	81.60	9.00	81.0	69.0	95.0
	Post	64.20	8.12	63.5	52.0	79.0

Table 2. Change scores and inferential statistics (n = 10)

Outcome	Mean Δ	SD Δ	Wilcoxon p	t-test p	Cohen's d	Improved
VAS Pain	-3.40	0.97	0.002	<0.001	-3.52	10/10
PQAS	-18.04	3.31	0.002	<0.001	-5.45	10/10
QOLQ	-17.40	2.59	0.002	<0.001	-6.72	10/10

Note: Lower scores on VAS, PQAS and QOLQ indicate improvement in this analysis.

4.2 Graphical representation

Figure 1 presents grouped mean $\pm$ SD comparisons. Figure 2 shows individual outcome panels.

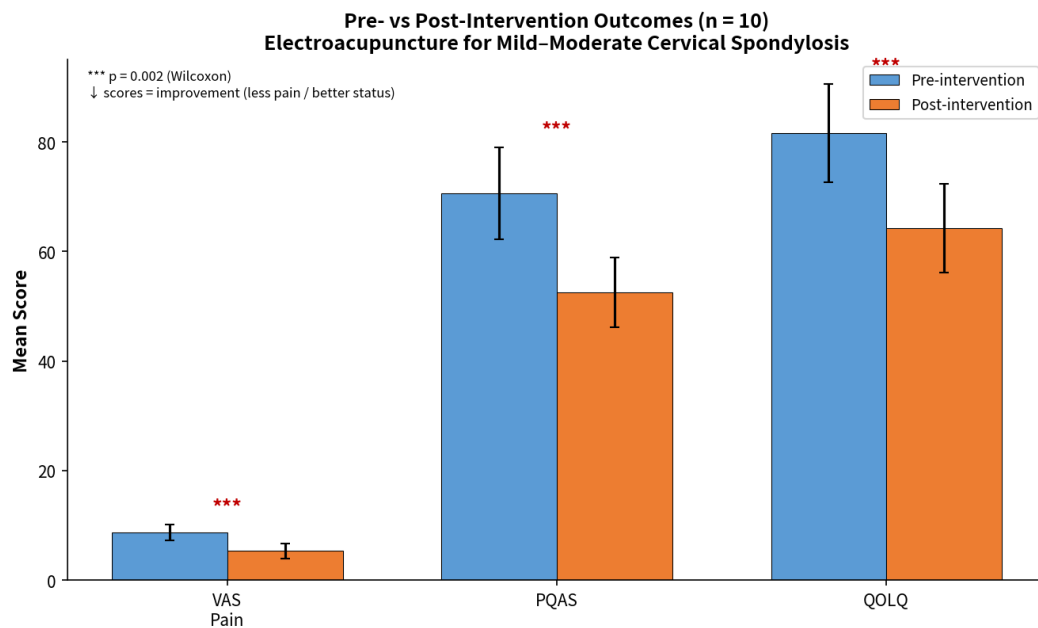


Figure 1. Mean pre- and post-intervention scores ($\pm$ SD). *** $p = 0.002$ (Wilcoxon signed-rank test).

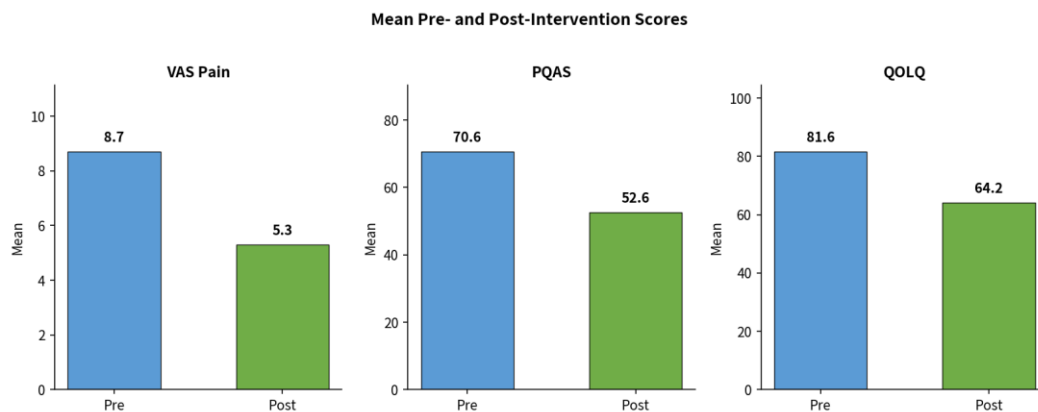


Figure 2. Mean pre- and post-intervention scores for VAS, PQAS and QOLQ.

4.3 Summary of key findings

VAS pain: Mean reduction -3.40 (SD 0.97); $p = 0.002$; $d = -3.52$; 10/10 improved.

PQAS: Mean reduction -18.04 (SD 3.31); $p = 0.002$; $d = -5.45$; 10/10 improved.

QOLQ: Mean reduction -17.40 (SD 2.59); $p = 0.002$; $d = -6.72$; 10/10 improved.

5. Discussion

In this single-group pre–post pilot study, a 10-day electroacupuncture protocol was associated with highly significant reductions in pain intensity (VAS), pain-quality burden (PQAS) and quality-of-life impact (QOLQ). Effect sizes were extremely large, and every participant improved on every measure.

These findings align with the clinical use of electroacupuncture for musculoskeletal and radicular pain and with reports that electrical stimulation may enhance analgesic and neuromodulatory effects beyond manual needling alone [6–8]. Multidimensional improvement—intensity, qualitative pain descriptors and life impact—supports the clinical relevance of the observed change beyond a single numeric pain rating.

Limitations include the small sample ($n = 10$), absence of a control or sham group, short duration, single-centre design, lack of blinding, and absence of long-term follow-up. Causal attribution cannot be established. The exact scoring polarity of the QOLQ instrument should be confirmed against the original questionnaire; in this dataset the decrease paralleled improvement on VAS and PQAS and was therefore interpreted as benefit. Larger randomised controlled trials with standardised disability scales (e.g., Neck Disability Index), imaging correlation where appropriate, and extended follow-up are needed.

6. Conclusion

Within the limitations of this single-group pre–post study, electroacupuncture administered daily for 10 days was associated with statistically significant and clinically substantial improvements in pain intensity, pain quality and quality-of-life impact in subjects with mild to moderate cervical spondylosis. The protocol was well tolerated. These preliminary findings support further evaluation of electroacupuncture as a non-pharmacological adjunct in the management of symptomatic cervical spondylosis.

Declarations

Conflict of interest: The author declares that there is no conflict of interest.

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Ethics: Written informed consent was obtained from all participants. The study was conducted as a student dissertation under institutional supervision.

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10. Instruments: Pain Quality Assessment Scale (PQAS); quality-of-life questionnaire as applied in the study protocol.