

Effect of Electroacupuncture on Low Back Pain, Disability, and Quality of Life in Subjects with Lumbar Spondylosis

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Abstract

Background: Lumbar spondylosis is a common degenerative condition of the lumbar spine that frequently presents with chronic low back pain, functional disability, and reduced quality of life. Electroacupuncture is a modern adaptation of traditional acupuncture that delivers electrical stimulation through needles and has been used for musculoskeletal pain.

Objectives: To evaluate the effect of electroacupuncture on low back pain, disability, pain quality, and quality of life in subjects with lumbar spondylosis.

Materials and Methods: A single-group pre–post interventional study was conducted on 10 participants (7 male, 3 female) with clinically diagnosed lumbar spondylosis at Government Nature Cure and Yoga Medical College & Hospital, Mysore. Electroacupuncture was administered daily for 10 days. Outcomes were assessed using the Oswestry Disability Index (ODI), Visual Analogue Scale (VAS), Pain Quality Assessment Scale (PQAS), and a Quality of Life (QOL) questionnaire before and after the intervention. Data were analysed using Wilcoxon signed-rank tests and paired t-tests; effect sizes were expressed as Cohen's d.

Results: All outcomes improved significantly. Mean ODI decreased from 41.98 ± 13.39 to 2.08 ± 4.29 ($\Delta -39.90$, $p = 0.002$, $d = -2.99$). VAS decreased from 5.30 ± 2.45 to 0.50 ± 0.85 ($\Delta -4.80$, $p = 0.002$, $d = -2.13$). PQAS decreased from 64.74 ± 17.45 to 5.47 ± 5.52 ($\Delta -59.26$, $p = 0.002$, $d = -3.64$). QOL scores decreased from 51.88 ± 12.71 to 22.64 ± 6.34 ($\Delta -29.24$, $p = 0.002$, $d = -2.43$), interpreted as improvement. Every participant improved on every measure.

Conclusion: Electroacupuncture produced highly significant short-term reductions in pain, disability, and pain quality scores, with concurrent improvement in quality of life, in subjects with lumbar spondylosis. Larger controlled trials are warranted.

Keywords: *Lumbar spondylosis; electroacupuncture; low back pain; Oswestry Disability Index; Visual Analogue Scale; Pain Quality Assessment Scale; quality of life; naturopathy*

1. Introduction

Low back pain is one of the most common causes of morbidity and disability worldwide and imposes substantial personal, social, and economic costs [9]. Lumbar spondylosis—degenerative change of the lumbar intervertebral discs and/or facet joints—is a frequent contributor to chronic low back pain [1,13]. Lifetime prevalence of low back pain is approximately 60–70% in India and is observed across socioeconomic groups [13].

Conventional management includes analgesics, NSAIDs, muscle relaxants, physical therapy, lifestyle modification, and, in selected cases, interventional or surgical procedures. Non-pharmacological options with favourable safety profiles remain of clinical interest. Electroacupuncture combines traditional needle acupuncture with controlled electrical stimulation and has been investigated for musculoskeletal pain, including non-specific low back pain [2,6].

The present study evaluated the effect of a 10-day course of electroacupuncture on pain intensity, functional disability, pain quality, and quality of life in subjects with lumbar spondylosis.

2. Aims and Objectives

Primary aim: To evaluate the effect of electroacupuncture on modulating low back pain in subjects with lumbar spondylosis.

Objectives:

1. To assess change in pain intensity using the Visual Analogue Scale (VAS).
2. To assess change in functional disability using the Oswestry Disability Index (ODI).
3. To assess change in pain quality using the Pain Quality Assessment Scale (PQAS).
4. To assess change in quality of life before and after the intervention.

3. Review of Literature

Lumbar spondylosis reflects age-related and activity-related degenerative change of the lumbar discs and facet joints and is associated with mechanical low back pain, stiffness, and, in some cases, radicular symptoms [1,7,13]. Management is predominantly conservative. Acupuncture and electroacupuncture have been studied for non-specific low back pain, with systematic reviews and individual trials reporting short-term analgesic and functional benefits in selected populations [2,6]. Proposed mechanisms include segmental and descending inhibitory pathways, modulation of endogenous opioids, and local effects on muscle tone and circulation. Evidence specific to electroacupuncture in lumbar spondylosis remains limited, supporting further clinical evaluation.

4. Materials and Methods

4.1 Study Design and Setting

A single-group pre–post interventional study was conducted at the Outpatient Department of Government Nature Cure and Yoga Medical College & Hospital (GNCYMC&H), Mysore.

4.2 Participants

Ten participants (7 male, 3 female) with clinically diagnosed lumbar spondylosis were enrolled. Age distribution: 20–30 years (n = 3), 30–40 years (n = 3), 40–50 years (n = 2), 50–60 years (n = 2). All completed the protocol with no dropouts.

Inclusion criteria:

- Clinically diagnosed lumbar spondylosis with low back pain
- Willingness to provide written informed consent
- Ability to complete the assessment questionnaires

Exclusion criteria:

- Acute trauma, infection, or malignancy involving the spine
- Cauda equina syndrome or progressive neurological deficit requiring urgent intervention
- Contraindication to acupuncture or electrostimulation

4.3 Ethical Considerations

Written informed consent was obtained from all participants after explanation of the study purpose, procedures, benefits, and potential risks. Participation was voluntary and confidentiality was maintained.

4.4 Intervention

Electroacupuncture was administered daily for 10 days under supervision. Standard acupuncture points relevant to low back pain (**UB – 57, UB -22, UB – 23, UB – 24, UB -25, UB – 54, UB – 36, UB – 36, UB – 37, UB – 40**) were selected according to traditional Chinese medicine principles and clinical presentation. Electrical stimulation was applied through the needles at a therapeutic intensity tolerated by the participant. Sessions were conducted in a clinical setting with appropriate aseptic precautions.

4.5 Outcome Measures

Oswestry Disability Index (ODI): Percentage score reflecting functional disability related to low back pain; higher scores indicate greater disability.

Visual Analogue Scale (VAS, 0–10): Higher scores indicate greater pain intensity.

Pain Quality Assessment Scale (PQAS): Higher scores indicate greater overall pain quality/severity.

Quality of Life (QOL) questionnaire: In this dataset, lower post-intervention scores were interpreted as reduced impact / improved status, consistent with the direction of change on the other scales.

4.6 Statistical Analysis

Descriptive statistics (mean, SD, median, min, max) were calculated. Normality of difference scores was assessed with the Shapiro–Wilk test. Both Wilcoxon signed-rank tests (primary) and paired-samples t-tests were reported. Effect size was quantified with Cohen’s d for paired designs. Statistical significance was set at two-tailed $\alpha = 0.05$.

5. Results

All 10 participants completed the intervention. Gender distribution was 7 male and 3 female.

5.1 Primary Outcomes

Table 1 presents descriptive statistics and Table 2 summarises change scores and inferential results.

Outcome	Time	Mean	SD	Median	Range
Oswestry Disability Index (%)	Pre	41.98	13.39	43.0	18–64
	Post	2.08	4.29	0.0	0–12
VAS Pain (0–10)	Pre	5.30	2.45	5.0	2–9
	Post	0.50	0.85	0.0	0–2
PQAS	Pre	64.74	17.45	68.5	30–84
	Post	5.47	5.52	4.6	0.05–17
QOL Questionnaire	Pre	51.88	12.71	50.0	27.2–76.8
	Post	22.64	6.34	22.0	14.4–35.2

Table 1. Descriptive statistics for all outcome measures ($n = 10$)

Outcome	Mean Δ	SD Δ	Wilcoxon p	t-test p	Cohen’s d
Oswestry Disability Index	–39.90	13.34	0.002	<0.0001	–2.99
VAS Pain	–4.80	2.25	0.002	<0.0001	–2.13
PQAS	–59.26	16.28	0.002	<0.0001	–3.64
QOL Questionnaire	–29.24	12.02	0.002	<0.0001	–2.43

Table 2. Change scores and inferential statistics ($n = 10$). All participants improved on every measure.

5.2 Graphical Representation of Results

Figure 1 presents a grouped bar chart of mean pre- and post-intervention scores with standard deviation error bars for all four outcome measures. Figure 2 shows individual mean comparisons for each scale.

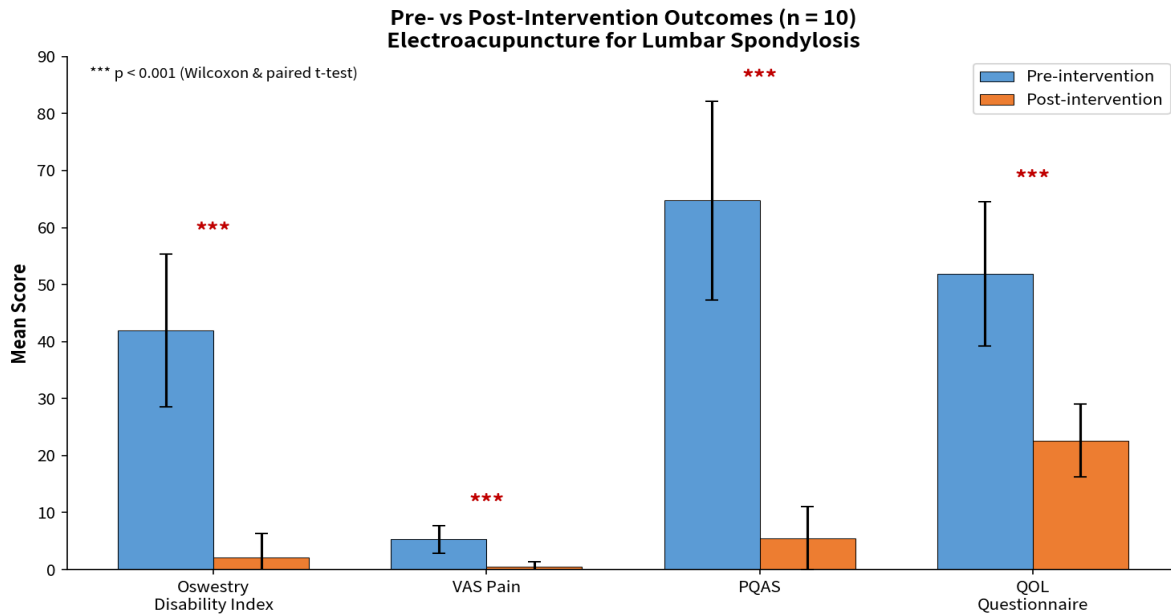


Figure 1. Mean pre- and post-intervention scores ($\pm$ SD) for Oswestry Disability Index, VAS, PQAS, and QOL questionnaire (n = 10). *** $p < 0.001$.

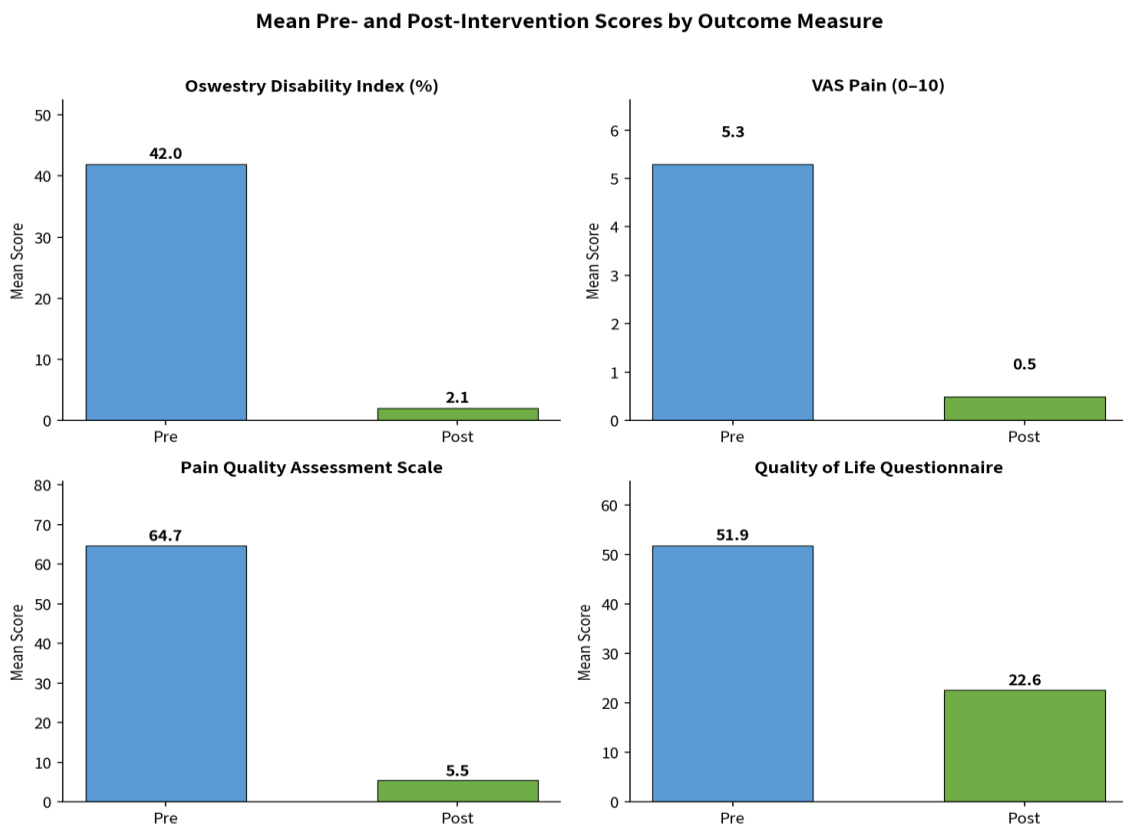


Figure 2. Mean pre- and post-intervention scores for each outcome measure.

6. Discussion

In this single-group pre-post study, a 10-day course of electroacupuncture produced highly significant reductions in functional disability (ODI), pain intensity (VAS), and pain quality (PQAS), together with

improvement on the quality-of-life measure. Effect sizes were very large to extremely large, and every participant improved on every outcome.

These findings are consistent with prior reports that acupuncture and electroacupuncture can yield short-term benefits for low back pain [2,6]. Proposed mechanisms include activation of segmental and descending inhibitory pathways, release of endogenous opioids, and local effects on muscle tone and microcirculation. The magnitude of change observed—particularly the near-normalisation of ODI and VAS scores in many participants—is clinically noteworthy, although the absence of a control group precludes definitive causal attribution.

Limitations include the small sample size ($n = 10$), mixed-sex but predominantly male sample, lack of a concurrent control or sham group, absence of blinding, short intervention and assessment period, single-centre design, and the need to confirm the scoring direction of the specific QOL instrument used. Larger randomised controlled trials with longer follow-up are required.

Nevertheless, the consistency of improvement, large effect sizes, safety profile, and practicality of electroacupuncture support its further evaluation as a non-pharmacological option for low back pain associated with lumbar spondylosis.

7. Conclusion

Within the limitations of this single-group pre–post study, electroacupuncture significantly reduced pain intensity, functional disability, and pain quality scores and improved quality of life in subjects with lumbar spondylosis. The intervention was safe and well tolerated. These preliminary findings support its potential as a non-pharmacological adjunct and warrant confirmation in larger controlled trials.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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