



Research Article

EFFICACY OF *MARMA CHIKITSA* AND TENS IN CERVICAL SPONDYLOSIS: A THREE ARM PARALLEL GROUP RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Cervical spondylosis is a common degenerative disorder of the cervical spine characterized by chronic neck pain, stiffness, restricted cervical mobility, and associated neurological manifestations, which significantly affect daily activities and quality of life. Non-invasive therapeutic approaches such as *Marma Chikitsa* and Transcutaneous Electrical Nerve Stimulation (TENS) are increasingly being explored for effective symptom management. **Objective:** To evaluate and compare the therapeutic efficacy of *Marma Chikitsa*, TENS therapy, and their combined application in the management of Grade 1 cervical spondylosis. **Methods:** This randomized clinical trial (registered on 24/12/2024) was conducted between January and June 2025 at OPD-32 and the in-patient department. Thirty patients aged 40–70 years diagnosed with Grade 1 cervical spondylosis were randomly allocated into three groups (n = 10 each): Group A received *Marma Chikitsa*, Group B received TENS therapy, and Group C received combined *Marma Chikitsa* and TENS therapy. All participants underwent treatment for 2 weeks, followed by cervical stretching and strengthening exercises. Clinical outcomes were assessed on Days 1, 8, 15, and 30 using the Visual Analogue Scale (VAS), Short-Form McGill Pain Questionnaire (SF-MPQ), Neck Disability Index (NDI), and cervical range of motion (ROM). **Results:** All groups demonstrated statistically significant improvement in pain, disability, and cervical mobility (p<0.001). However, Group C showed the greatest reduction in pain intensity, improved functional capacity, and enhanced cervical ROM, particularly in forward flexion and rotational movements. **Conclusion:** The combined use of *Marma Chikitsa* and TENS therapy was more effective than either therapy alone, suggesting a safe, non-invasive, and beneficial integrative treatment approach for cervical spondylosis management.

INTRODUCTION

Cervical spondylosis is a common degenerative condition of the cervical spine involving disc degeneration, pseudoarthrosis, and osteoarthritic changes in the apophyseal joints. Despite widespread radiological evidence of spondylotic changes, most individuals remain asymptomatic^[1,2]. Approximately 25% of people under 40, 50% over 40, and up to 85% over 60 years show radiographic signs of degeneration^[2,3].

The most commonly affected spinal levels are C5–C6 and C6–C7. Symptomatic cases often present with neck pain, whose point prevalence in the general population ranges from 0.4% to 41.5%, with a lifetime prevalence as high as 86.8%. The 1-year incidence varies between 4.8% and 79.5%^[4]. According to the Global Burden of Disease 2015, neck and low back pain remain leading causes of years lived with disability (YLD) and rank fourth in disability-adjusted life years (DALY)^[5,6].

Cervical spondylosis may cause three overlapping syndromes due to spondylotic neural or vascular encroachment: radiculopathy, myelopathy, and vertebral artery compression^[7]. Though the etiology remains unclear, it may be aggravated by trauma, overuse, or genetic factors. While many

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remain asymptomatic, symptoms may develop spontaneously or after sustained neck postures^[8]. Degenerative changes can begin as early as the third decade of life and may be triggered by even minor trauma^[9].

In recent years, cervical spondylosis has shown increasing incidence in younger individuals, often attributed to poor posture and muscular imbalance. This early onset leads to significant physical and psychological distress, with clinical signs including altered cervical curvature and spinal instability on imaging^[10].

Marma points are vital anatomical sites where *Mamsa* (muscle), *Sira* (vessels), *Snayu* (ligaments/nerves), *Asthi* (bone), and *Sandhi* (joints) converge. These are key centers of *Prana* (life force), and their stimulation influences physiological balance and *Dosha* harmony^[11]. *Marma Chikitsa* is a non-invasive technique that activates internal healing and is effective in musculoskeletal and neurological disorders like *Vata Vyadhi*, which manifests as stiffness, numbness, and joint pain closely resembling cervical spondylosis.^[12,13]

This study utilized five *Marma* points: *Kshipra*, *Manibandha*, *Kurpara*, *Amsa*, *Krkatika* and known to relieve neck stiffness and spasm^[14,15]. Their measurements range from $\frac{1}{2}$ to 3 angula (0.88–5.2cm), with 1 *Angula* equal to approximately 1.736cm^[16,17]

Physiotherapy is a health profession focused on optimizing movement and physical function across prevention, treatment, and rehabilitation domains^[18]. In cervical spondylosis, non-surgical interventions like stretching, strengthening exercises, and Transcutaneous Electrical Nerve Stimulation (TENS) are often first-line therapies to relieve pain and improve daily function.

TENS delivers low-voltage electrical currents through surface electrodes to modulate pain signals^[19]. Though originally used to assess spinal cord stimulation, its analgesic effects were recognized as early as the first century in classical medicine^[20], and it is now widely used in musculoskeletal conditions for non-invasive pain relief.

AIM AND OBJECTIVES

Aim

To evaluate and compare the efficacy of *Marma Chikitsa* and Transcutaneous Electrical Nerve Stimulation (TENS) in the management of cervical spondylosis.

Objective

- To develop a treatment protocol for cervical spondylosis that prioritizes safety, efficacy.
- Enhancing the well-being of individuals with cervical spondylosis by improving their quality of life and ensuring the long-term sustainability of treatment effects.

MATERIALS AND METHODS

Ethical Clearance: Before initiating the trial, the proposed clinical study received approval from the Institutional Ethics Committee.

Study Design: This is a Phase 2 randomized interventional clinical trial (SNOSE Method). A computer-generated random sequence (variable block sizes of 3 and 6, no stratification) was prepared. Blocked randomisation ensured 1:1:1 allocation across the three arms.

Blinding: Blinding was not implemented for participants or providers due to nature of the intervention.

Participants and Sampling: A total of 30 patients diagnosed with Grade 1 cervical spondylosis, aged 40–70 years, are selected using a random sampling method, with 10 patients in each group. A formal hypothesis-based sample size calculation was not conducted.

Consent and Registration of the Patients: After counselling, informed, written, and witnessed consent was obtained from each patient. Those who voluntarily agreed were enrolled in the trial. Patient confidentiality was strictly maintained; no identifying information was disclosed.

Inclusion Criteria

Participants selected for the study met the following criteria: individuals aged 40 to 70 years of either sex, presenting with pain in the cervical region and a reduced range of motion, along with radiological evidence of degenerative changes in the cervical spine.

Exclusion Criteria

Patients with conditions such as inflammatory arthritis, spinal fractures, radiating pain, traumatic or non-mechanical cervical injuries, or chronic systemic illnesses like tuberculosis or uncontrolled diabetes mellitus. Additional exclusion criteria included tumors or infections involving the cervical spine, cervical myelopathy, recent cervical or spinal surgery, and any contraindications to TENS therapy, such as pacemakers, pregnancy, seizure disorders, deep vein thrombosis (DVT), or open wounds in the treatment area.

Patient Withdrawal Criteria

Patients were allowed to withdraw voluntarily at any stage of the study. Withdrawal was also done in cases of non-compliance, adverse reactions, development of unrelated serious illness, or if the patient became medically or psychologically unfit to continue.

Follow-Up Schedule

Participants were monitored at specific intervals to track their response to treatment. The initial follow up was carried out on the 8th day, corresponding to the end of the first week. The second

follow up took place on the 15th day, marking the completion of the second week. A final evaluation was performed on the 30th day, following the conclusion of the treatment period. At each visit, a detailed clinical assessment was conducted according to the established evaluation criteria to ensure accurate monitoring of therapeutic outcomes.

Methodology

Group A received *Marma Chikitsa*, where five specific Marma points *Amsa*, *Krkatikaka*, *Kurpara*, *Manibandha*, and *Kshipra* were stimulated. The stimulation was synchronized with the patient's natural breathing rhythm, approximately 18 cycles per minute. Each *Marma* point was gently pressed and released 15 to 20 times per session. The therapy was administered twice daily, with a minimum two-hour interval between sessions, for a total duration of two weeks. After the first week, strengthening and stretching exercises were introduced.

Group B received Transcutaneous Electrical Nerve Stimulation (TENS) therapy. The TENS unit was set at a frequency of 100 Hz and applied for 10 minutes daily for two weeks. Similar to Group A, strengthening and stretching exercises were added after the first week of treatment.



Figure 1: TENS Machine

Group C received a combined approach, beginning with *Marma Chikitsa* followed by TENS therapy during each session. This integrative protocol

Subjective Parameters

was also carried out for two weeks, with therapeutic exercises introduced from the second week onwards

Intervention Providers

All interventions were delivered at the Department of Marmalogy and Sports Medicine, National Institute of Ayurveda, Jaipur. TENS therapy was administered in the Physiotherapy Unit by Dr. Sandeep Sharma (BPT), a physiotherapist experienced in musculoskeletal rehabilitation, while *Marma Chikitsa* was performed in the OPD and IPD of the Shalya Department by Prof. (Dr.) Suman Sharma (MD, PhD), an Ayurveda specialist with over a decade of expertise in *Marma* science. Both providers underwent study-specific training, and treatment fidelity was ensured using a standardized checklist.

Statistical Methods

Group comparisons across time were evaluated with repeated-measures ANOVA applying Greenhouse-Geisser correction. Between-group differences were tested with Tukey/Dunn procedures, while within-group changes were assessed using paired t-tests or Wilcoxon methods. Effect sizes with 95% confidence intervals were calculated. Analyses followed the intention-to-treat approach, with per-protocol analyses as sensitivity checks; missing data ($\geq 5\%$) were managed using multiple imputation ($m=20$ datasets). A two-sided significance level of 0.05 was applied.

Assessment Criteria

The effectiveness of the clinical intervention will be evaluated using both subjective and objective measures.

Subjective assessment will include the use of the Short-Form McGill Pain Questionnaire (SF-MPQ) to analyze the nature and intensity of pain, the Visual Analogue Scale (VAS) to record pain severity, and the Neck Disability Index (NDI) to determine the extent of functional limitations experienced by the patient.

For objective evaluation, the range of motion (ROM) of the cervical spine will be measured to assess physical improvement. These combined parameters will help determine the overall therapeutic outcome of the interventions.

Table 1: Pain Assessment - Visual Analogue Scale (VAS)

Grade	Score	Interpretation
0	0	No pain
1	1-3	Mild pain
2	4-6	Moderate pain
3	7-10	Severe pain

Table 2: Short-Form McGill Pain Questionnaire (SF-MPQ)

Grade	Score Range	Interpretation
0	0	No pain
1	1–15	Mild pain
2	16–30	Moderate pain
3	31–45	Severe pain

Table 3: Neck Disability Index (NDI)

Grade	Percentage Score	Interpretation
0	0–4%	No disability
1	5–14%	Mild disability
2	15–24%	Moderate disability
3	25–34%	Severe disability
4	>34%	Complete disability

Objective Parameters**Table 4: Cervical Range of Motion (ROM) (Forward Flexion)**

Grade	Range	Interpretation
0	45°–50°	Normal
1	35°–44°	Mild restriction
2	25°–34°	Moderate restriction
3	<25°	Severe restriction

Table 5: Cervical Range of Motion (ROM) (Extension)

Grade	Range	Interpretation
0	45°–60°	Normal
1	30°–44°	Mild restriction
2	15°–29°	Moderate restriction
3	<15°	Severe restriction

Table 6: Cervical Range of Motion (ROM) (Lateral Flexion)

Grade	Range	Interpretation
0	40°–45°	Normal
1	30°–39°	Mild restriction
2	20°–29°	Moderate restriction
3	<20°	Severe restriction

Table 7: Cervical Range of Motion (ROM) (Rotation)

Grade	Range	Interpretation
0	70°–90°	Normal
1	50°–69°	Mild restriction
2	30°–49°	Moderate restriction
3	<30°	Severe restriction

OBSERVATIONS

A total of 30 participants were enrolled and randomly assigned into three equal groups (A, B, and C), each comprising 10 patients. The mean age was 52.30 ± 10.54 in Group A, 51.30 ± 13.12 in Group B, and 57.30 ± 8.69 in Group C, with no significant difference between them ($p = 0.433$). Gender distribution showed a predominance of males in Group A (80%), while Group B had 60% females and Group C had 70% males ($p=0.155$). All participants were married (100%), and most followed the Hindu religion (80–90%). Across all groups, 80% of individuals belonged to the middle-income category, and 60% resided in rural areas.

Regarding clinical history, the majority presented with chronic onset of cervical pain: 50% in Group A, 70% in Group B, and 80% in Group C. Sharp pain was reported by 50% across all groups, and posture was identified as the most common triggering factor. Sleep disturbance was notably different across the groups, with statistical significance ($p=0.007$): 60% in Group A, 40% in Group B, and 50% in Group C reporting disturbed sleep. All participants had irregular physical activity patterns (100%) and a normal cervical spine length (100%). Mild tenderness was present in 50% of patients in each group, while vital signs such as pulse, temperature, systolic and diastolic blood pressure remained within normal limits and showed no significant differences between the groups ($p > 0.05$).

These observations reflect that baseline demographic and clinical variables were comparable across all groups, establishing uniformity before the initiation of treatment.

Table 8: Comparison of SFMPQ-Total Score Between Groups

Day	Group A Mean (SD)	Group B Mean (SD)	Group C Mean (SD)	Between-Group P value
Day 1	26.3 (6.52)	34.4 (5.13)	22.2 (4.10)	<0.001
Day 8	21.9 (6.30)	30.9 (5.29)	18.9 (4.54)	<0.001
Day 15	21.0 (6.16)	29.9 (5.21)	17.4 (4.21)	<0.001
Day 30	21.0 (6.16)	29.9 (5.21)	17.4 (4.21)	<0.001
Within-Group P value	<0.001	<0.001	<0.001	

This table compares SF-MPQ total scores. Group A showed a decline from 26.3 to 21.0, Group B from 34.4 to 29.9, and Group C from 22.2 to 17.4. The p-values were <0.001 across all four time points, indicating highly significant differences in total pain scores between the groups.

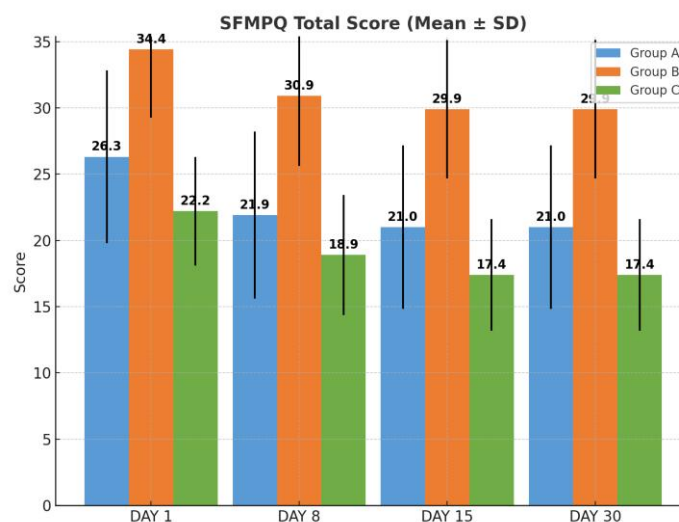
Figure: 2

Table 9: Comparison of Total Pain Rating Index (PRI) Between Groups

Day	Group A Mean (SD)	Group A Median (IQR)	Group B Mean (SD)	Group B Median (IQR)	Group C Mean (SD)	Group C Median (IQR)	P value
Day 1	20.3 (5.0)	20.0 (17–23)	27.6 (4.3)	28.0 (24–31)	16.6 (3.0)	16.0 (14–18)	<0.001
Day 8	16.6 (4.5)	17.0 (14–20)	24.4 (4.2)	25.0 (21–28)	13.9 (2.7)	14.0 (12–16)	<0.001
Day 15	15.4 (4.0)	15.0 (13–18)	23.2 (4.1)	23.0 (19–26)	12.4 (2.6)	12.0 (10–14)	<0.001
Day 30	15.4 (4.0)	15.0 (13–18)	23.2 (4.1)	23.0 (19–26)	12.4 (2.6)	12.0 (10–14)	<0.001
Within the groups P value	<0.001		<0.001		<0.001		

This table presents the Total Pain Rating Index (PRI). Group A decreased from 20.3 to 15.4, Group B from 27.6 to 23.2, and Group C from 16.6 to 12.4. The p-values across all four time points were <0.001, indicating significant group differences in total PRI.

Figure: 3

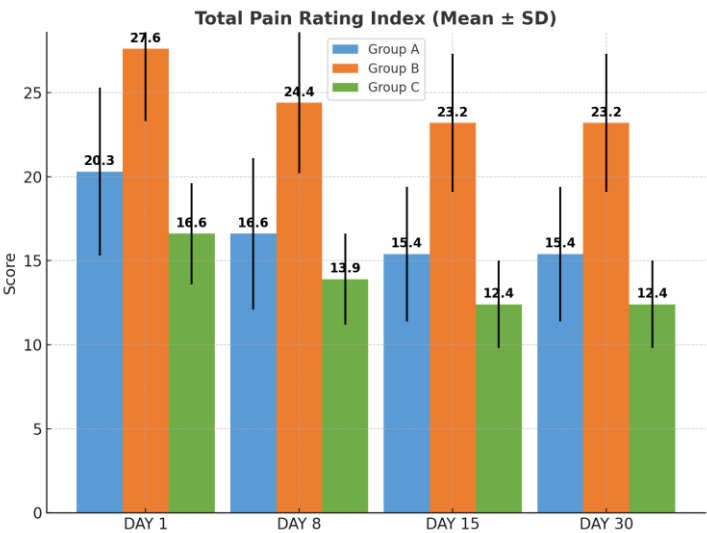
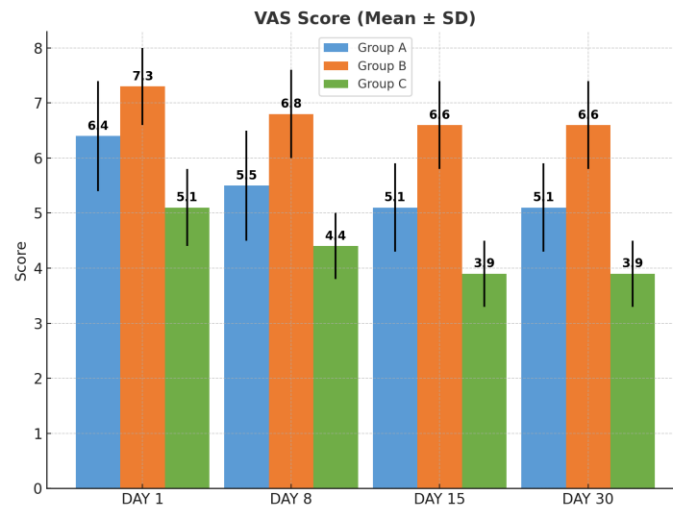


Table 10: Comparison of VAS Score Between Groups

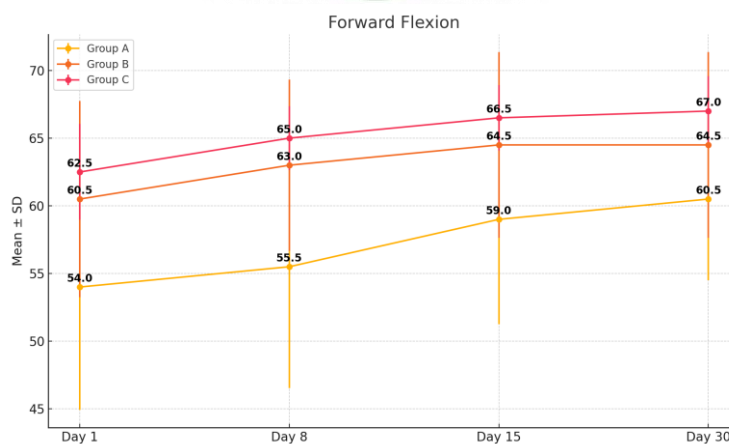
Day	Group A Mean (SD)	Group A Median (IQR)	Group B Mean (SD)	Group B Median (IQR)	Group C Mean (SD)	Group C Median (IQR)	P value
Day 1	20.3 (5.0)	20.0 (17–23)	27.6 (4.3)	28.0 (24–31)	16.6 (3.0)	16.0 (14–18)	<0.001
Day 8	16.6 (4.5)	17.0 (14–20)	24.4 (4.2)	25.0 (21–28)	13.9 (2.7)	14.0 (12–16)	<0.001
day 15	15.4 (4.0)	15.0 (13–18)	23.2 (4.1)	23.0 (19–26)	12.4 (2.6)	12.0 (10–14)	<0.001
Day 30	15.4 (4.0)	15.0 (13–18)	23.2 (4.1)	23.0 (19–26)	12.4 (2.6)	12.0 (10–14)	<0.001
Within the group p values	<0.001		<0.001		<0.001		

This table compares VAS (Visual Analog Scale) scores. Group A dropped from 6.4 to 5.1, Group B from 7.3 to 6.6, and Group C from 5.1 to 3.9. All p-values were <0.001, suggesting statistically significant differences in pain perception over time.

Figure: 4**Table 11: Comparison of Forward Flexion between groups**

Time Point	Group A Mean (SD)	Group B Mean (SD)	Group C Mean (SD)	P value
Day 1	54.0 (9.07)	60.5 (7.25)	62.5 (3.54)	0.030
Day 8	55.5 (8.96)	63.0 (6.32)	65.0 (2.36)	0.007
Day 15	59.0 (7.75)	64.5 (6.85)	66.5 (2.42)	0.030
Day 30	60.5 (5.99)	64.5 (6.85)	67.0 (2.58)	0.041

This table compares forward flexion across groups at four time points. Group A had mean values increasing from 54.0 (SD=9.07) on Day 1 to 60.5 (SD=5.99) on Day 30. Group B increased from 60.5 to 64.5 and Group C from 62.5 to 67.0. The p-values at each time point were 0.030, 0.007, 0.030, and 0.041, respectively, indicating significant differences at all time points.

Figure 5**Table 12: Comparison of Backward Extension between groups**

Day	Group A Mean (SD)	Group B Mean (SD)	Group C Mean (SD)	P value
Day 1	36.0 (3.94)	36.5 (5.3)	37.5 (4.25)	0.755
Day 8	38.0 (4.22)	38.5 (4.12)	39.0 (2.11)	0.827
Day 15	39.5 (3.69)	39.0 (3.16)	39.5 (2.84)	0.924
Day 30	39.5 (3.69)	39.0 (3.16)	40.5 (1.58)	0.520

This table presents backward extension comparisons over four time points. Mean values in Group A ranged from 36.0 to 39.5, in Group B from 36.5 to 39.0, and in Group C from 37.5 to 40.5. The p-values (ranging from 0.520 to 0.924) indicate no statistically significant difference across the groups.

Figure 6

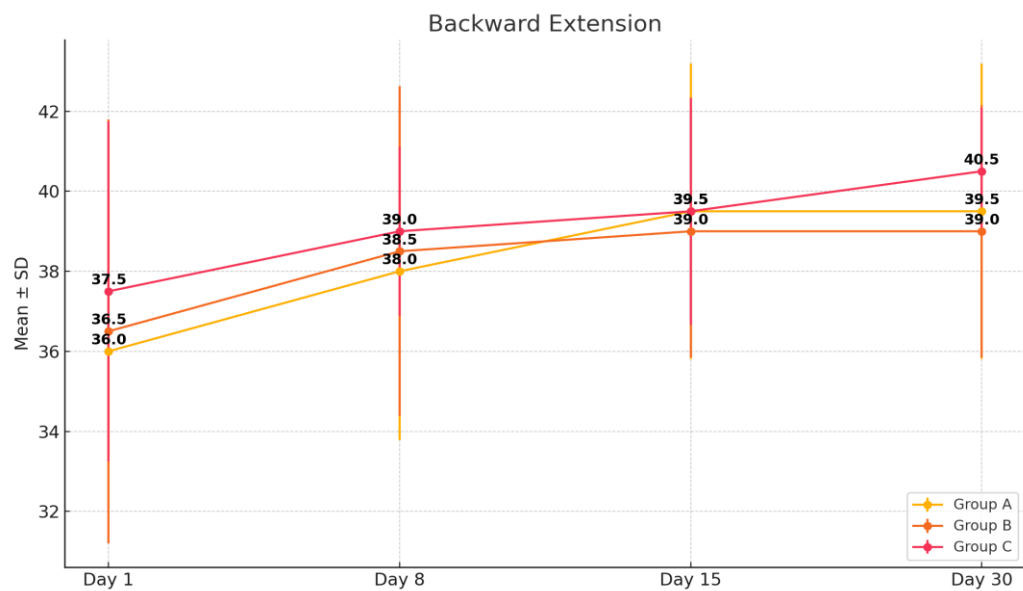


Table 13: Comparison of Left Lateral Flexion between groups

Day	Group A Mean (SD)	Group B Mean (SD)	Group C Mean (SD)	P value
Day 1	34.5 (10.39)	35.0 (4.71)	34.5 (4.97)	0.984
Day 8	37.0 (7.53)	36.5 (4.12)	38.0 (3.5)	0.817
Day 15	37.5 (6.35)	36.5 (4.12)	39.0 (2.11)	0.473
Day 30	39.0 (6.15)	36.5 (4.12)	40.0 (0.0)	0.188

This table compares left lateral flexion over time. Group A's mean improved from 34.5 to 39.0, Group B from 35.0 to 36.5, and Group C from 34.5 to 40.0. P-values across the time points were all above 0.05 (ranging from 0.188 to 0.984), indicating no significant differences between the groups.

Figure 7

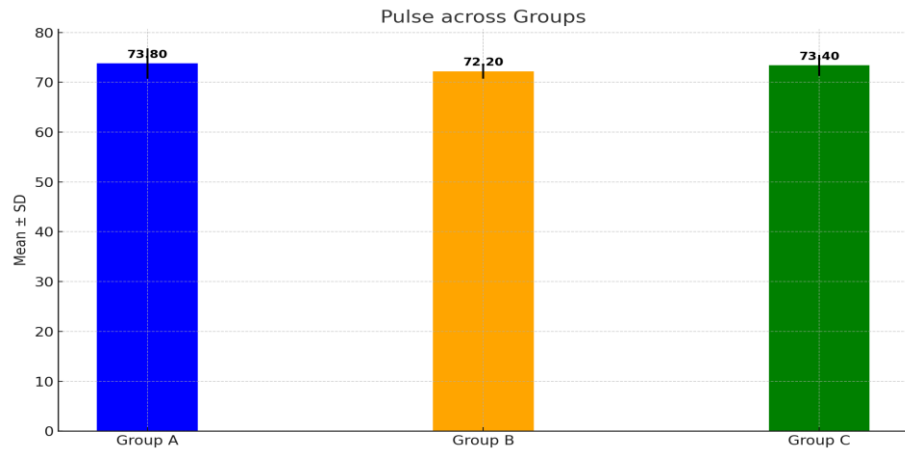
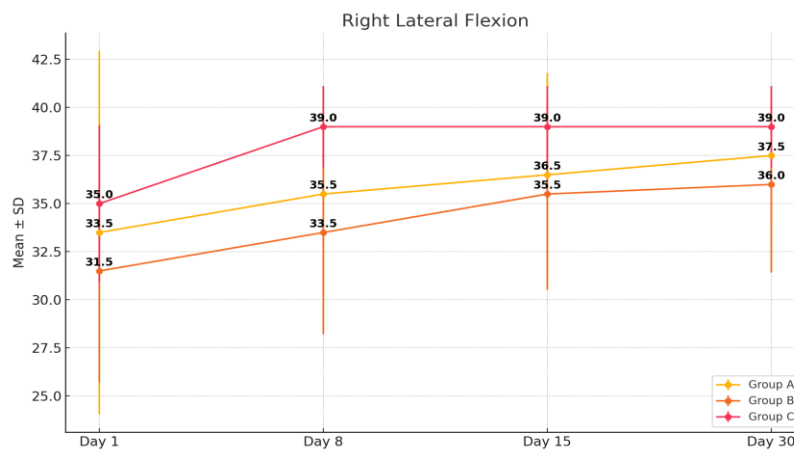


Table 14: Comparison of Right Lateral Flexion between groups

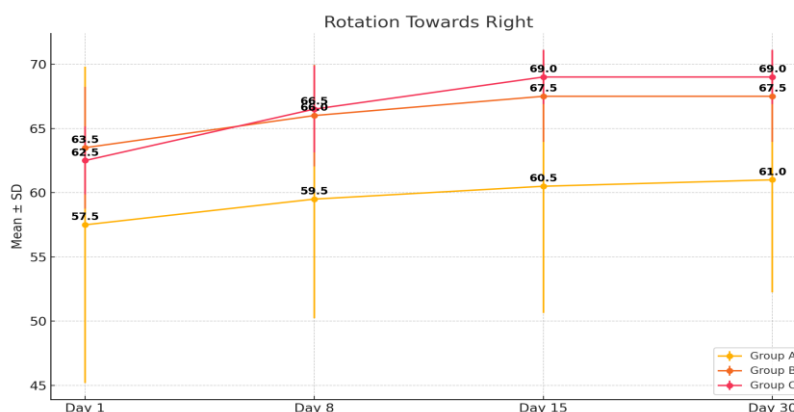
Day	Group A Mean (SD)	Group B Mean (SD)	Group C Mean (SD)	P value
Day 1	33.5 (9.44)	31.5 (5.8)	35.0 (4.08)	0.523
Day 8	35.5 (5.5)	33.5 (5.3)	39.0 (2.11)	0.038
Day 15	36.5 (5.3)	35.5 (4.97)	39.0 (2.11)	0.201
Day 30	37.5 (3.54)	36.0 (4.59)	39.0 (2.11)	0.189

This table displays right lateral flexion over time. Group A showed an increase from 33.5 to 37.5, Group B from 31.5 to 36.0, and Group C from 35.0 to 39.0. Only the Day 8 p-value (0.038) indicated a statistically significant difference; all others were >0.05.

Figure 8**Table 15: Comparison of Rotation Towards Right between groups**

Day	Group A Mean (SD)	Group B Mean (SD)	Group C Mean (SD)	P value
Day 1	57.5 (12.3)	63.5 (4.74)	62.5 (2.64)	0.199
Day 8	59.5 (9.26)	66.0 (3.94)	66.5 (3.37)	0.029
Day 15	60.5 (9.85)	67.5 (3.54)	69.0 (2.11)	0.010
Day 30	61.0 (8.76)	67.5 (3.54)	69.0 (2.11)	0.008

This table compares rotation towards the right. Mean values for Group A increased from 57.5 to 61.0, for Group B from 63.5 to 67.5, and for Group C from 62.5 to 69.0. The p-values on Day 8 (0.029), Day 15 (0.010), and Day 30 (0.008) were statistically significant, suggesting differences in improvement across groups.

Figure 9

RESULTS

All three groups of *Marma Chikitsa* (Group A), TENS (Group B), and the combination therapy (Group C) showed statistically significant improvement ($p < 0.001$) in pain intensity, functional disability, and cervical range of motion across the 30-day study period. However, Group C consistently demonstrated superior outcomes in most parameters, including total SF-MPQ scores, Present Pain Intensity (PPI), Visual Analogue Scale (VAS), and range of cervical motion (especially forward flexion and cervical rotation). For example, Group C's total SF-MPQ score reduced from 22.2 to 17.4, while Group A and B showed lesser improvements. Improvements in rotation towards both right and left were significantly higher in Group C ($p < 0.01$). Pain components such as "sharp," "sickening," and "troubling" sensations also showed greater reduction in Group C by day 30. Although backward extension and lateral flexions improved across all groups, between-group differences were statistically insignificant. Notably, Group C also showed better improvements in quality-of-life indicators like sleep, mood, and walking ability, further supporting the efficacy of an integrative approach combining *Marma Chikitsa* with TENS.

Participant Flow, Recruitment, and Intervention Delivery

Thirty eligible participants were randomized equally into three groups ($n=10$ each), all receiving their assigned interventions with complete follow-up and no exclusions. Recruitment occurred between January and June 2025 with assessments on days 8, 15, and 30. Interventions were protocol-based, delivered by trained providers, with adherence monitored by checklists; all groups received standardized week-2 stretching/strengthening exercises. No adverse events or unintended effects were reported in any of the three groups during the study period.

Table 16

Parameter Type	Assessment Parameter	Tool / Method Used	Observation / Result	Statistical Significance
Subjective Parameter	Pain intensity	Visual analogue scale (VAS)	Significant reduction in pain observed in all groups; maximum improvement seen in Group C (Combination Therapy). VAS score reduced from 5.1 to 3.9 by Day 30.	$p < 0.001$
Subjective Parameter	Nature and severity of pain	Short form McGill pain questionnaire (SF-MPQ)	Total SF-MPQ scores improved significantly in all groups. Group C showed greatest reduction from 22.2 to 17.4.	$p < 0.001$
Subjective Parameter	Pain Rating Index (PRI)	SF-MPQ pain rating index	PRI decreased significantly in all groups; Group C showed best improvement from 16.6 to 12.4.	$p < 0.001$
Subjective Parameter	Functional disability	Neck Disability Index (NDI)	Functional disability associated with cervical pain improved in all groups, with superior outcome in Group C.	$p < 0.001$
Subjective Parameter	Quality of life	Clinical assessment	Improvement observed in sleep, mood, daily activities, and walking ability, especially in Group C.	Clinically Significant
Objective Parameter	Cervical range of motion (ROM)	Goniometric/clinical ROM assessment	Significant improvement in cervical mobility was observed after treatment in all groups.	$p < 0.001$
Objective Parameter	Forward flexion	ROM measurement	Maximum improvement noted in Group C compared to Groups A and B.	$p < 0.01$
Objective Parameter	Cervical rotation (right & left)	ROM measurement	Rotation movements improved significantly, particularly in Group C.	$p < 0.01$
Objective Parameter	Cervical tenderness & physical	Clinical examination	Reduction in tenderness and improvement in neck movement	Clinically Improved

	findings		observed after intervention.	
Objective Parameter	Vital signs	Pulse, BP, temperature assessment	Vital parameters remained within normal physiological limits throughout the study.	Not Significant

DISCUSSION

The present investigation revealed that demographic and baseline characteristics encompassing age, sex, religion, marital status, socioeconomic background, and occupational profile were uniformly distributed across the three study cohorts, with no statistically significant intergroup differences. Such baseline homogeneity enhances the internal validity of the trial by allowing the observed treatment effects to be more confidently attributed to the therapeutic interventions rather than to pre-existing disparities. From a clinical standpoint, the onset, nature, and temporal progression of cervical pain, as well as the aggravating and alleviating factors, demonstrated comparable patterns across all groups. Chronic, intermittent pain emerged as the predominant presentation among participants; however, sleep disturbances differed significantly, with Groups A and C exhibiting higher rates of disruption. Other lifestyle related and medical history parameters remained largely comparable.

Physical examination revealed no notable differences in cervical spine morphology or in pathological signs such as crepitus and torticollis. Nonetheless, statistically significant improvements were observed over time in cervical mobility parameters specifically forward flexion and right-sided rotation indicating differential therapeutic responsiveness. While certain mobility outcomes improved consistently across all groups, others demonstrated more pronounced gains within specific cohorts.

Pain evaluation via the Short Form McGill Pain Questionnaire (SF-MPQ) uncovered marked intergroup variations. Group B persistently recorded higher pain intensity scores, whereas Group C receiving a combined regimen of *Marma* therapy and transcutaneous electrical nerve stimulation (TENS) exhibited the most substantial and sustained reductions in pain across multiple descriptors and indices, including Present Pain Intensity and the Pain Rating Index. These differences achieved strong statistical significance, with results consistently favouring Group C.

Quality of life metrics including sleep quality, mood, physical activity, occupational productivity, and social participation were significantly superior in Group C at all post intervention assessments. These enhancements extend beyond symptomatic relief, reflecting a broader amelioration of psychosocial well-being. The consistent and superior clinical outcomes in

Group C underscore the therapeutic advantage of integrating *Marma* therapy with TENS for the management of chronic cervical conditions, offering both functional restoration and enhanced quality of life beyond those achieved by the other modalities under investigation.

Limitation

The sample size was relatively small, which may limit the generalizability of the findings. Additionally, the study was conducted at a single center, which may introduce site specific biases. The short duration of follow up (30 days) restricts the ability to assess long term outcomes and recurrence rates. Furthermore, the study did not include blinding, which could have influenced subjective outcome measures such as pain perception.

Recommendation

Future research with larger, multi center cohorts and extended follow up periods is recommended to validate and expand upon these results.

CONCLUSION

The present clinical study demonstrated that both *Marma Chikitsa* and TENS therapy are effective in managing Grade 1 cervical spondylosis, with significant improvements observed in pain intensity, cervical mobility, and overall functional capacity. Among the three groups, the combined therapy group with *Marma chikitsa* and TENS showed the highest degree of clinical improvement, indicating a synergistic effect when both modalities are used together. This supports the integration of Ayurvedic therapeutic techniques like *Marma Chikitsa* with evidence-based physiotherapy interventions. The combined protocol not only provided better symptom relief but also enhanced the quality of life without adverse effects of pharmacological interventions, making it a safe and sustainable approach. Therefore, this integrative model may serve as a valuable option in the clinical management of cervical spondylosis without any side effects.

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