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Research Article

EFFECT OF *AROHANA ANUVASANA VASTI* WITH *PRABHANJANAVIMARDANAM TAILA* IN LUMBAR SPONDYLOSIS

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ABSTRACT

Lumbar spondylosis is a chronic, non-inflammatory condition characterised by deterioration of the lumbar spine's discs, vertebral bodies, and facet joints. Lumbar spondylosis can be associated with *Kateegraha*, described in our classics. Lumbar spondylosis is a *Dhatukshayajanya vatavikara,* and *Vasti* being the prime treatment modality for *Vata*, the present effort is to study the effect of *Prabhanjanavimardanam taila*, mentioned in the *Tailaprakarana* of *Sahasrayoga*, which is indicated for *Ashiti vatarogas* in as *Pana, Abhyanga*, *Nasya*, and *Vastikarma*, and hence is a good choice in this condition. Considering both the *Dosa kopa* and the vitiated *Dosa sthana, anuvasana* was selected as the mode of administration. **Materials and Methods:** The study design is an experimental study with a pre-post assessment without a control group. Participants, irrespective of sex, aged between 30-60 years, registered in the OPD and IPD of Government Ayurveda Panchakarma Hospital, Poojappura, Thiruvananthapuram, diagnosed to have lumbar spondylosis and satisfying the inclusion criteria, were selected. The baseline data was gathered by interviews, observations, and questionnaires. A total of 25 people were chosen for the study. The participants were given *Deepana pachana* medicines for 3 days, followed by the administration of *Arohana anuvasana vasti* with *Prabhanjanavimardanam taila* for 9 consecutive days at a fixed escalating dose. The participants were assessed before and after with regard to changes in subjective parameters like pain, tenderness, and morning stiffness measured by VAS score, Quebec Back Pain Disability Scale, and range of movements by goniometry. **Results and discussion:** Data were statistically analysed using the Wilcoxon signed-rank test and the paired t-test. In all these parameters, significant reductions in symptoms were noted. **Conclusion:** The study concludes that *Arohana anuvasana vasti* with *Prabhanjanavimardanam taila* is effective in reducing signs and symptoms of participants with lumbar spondylosis. (CTRI/2024/07/071523).

INTRODUCTION

Spondylosis, also known as osteoarthritic spine disease, usually develops at a later age and mostly affects the cervical and lumbar spines. The spinal column's deterioration due to ageing is the primary reason for spondylosis[1]. The osteoarthritis degenerative process primarily impacts the facet joints, neural foramina, and vertebral bodies (facet syndrome) [2].

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Spondylosis can occur in the joints along the entire spine, but it most commonly appears in the neck and lower back areas. The lower back is especially at risk because it bears most of the body's weight and is exposed to significant physical stress. The typical condition involves the failure of one or more spinal discs, which normally support and cushion the vertebrae. As people age, their spines naturally begin to wear down, but not everyone experiences back pain as a result. Lumbar spondylosis can begin as early as age 20. A significant portion of the population with asymptomatic lower back pain is estimated to be between 27 and 37%. In the United States, 3% of individuals aged 20 to 29 and more than 80% of those over 40 are obese and have had lumbar spondylosis for

several years[3]. 74% of women and 84% of men, respectively, have vertebral osteophytes, which are most commonly found at the T9–T10 and L3 levels. On average, about 30% of men and 28% of women aged 55 to 64 have lumbar osteophytes. Approximately 20% of men and 22% of women aged 45 to 64 also have lumbar osteophytes [4].

The majority of persons with lumbar spondylosis react effectively to nonsteroidal anti-inflammatory medicines, pain relievers, heat and ice applications, and physical therapy treatments. If the pain doesn't go away after those mentioned above, surgical therapy may be an option, such as the removal of a deteriorating disk or fusing the vertebrae.

Due to similar presentations, lumbar spondylosis can be correlated with *Kateegraha,* mentioned in our classics. The word *Kateegraha* is derived from the union of two words, viz., *Kati* and *Graha.* The word *Kati* signifies the region of the lower back, and the word *Graha* means stiffness. So, the word *Kateegraha* can be taken as grasping pain in the lower back region. In *Brihathtrayis, Kateegraha* is considered an associated symptom of various conditions like *Gridhrasi, Vatarakta*, etc. *Kateegraha,* as a separate disease, has been described in the classical text *Gada Nigraha*[5]. *Kateegraha* is one of the *Nanatmaja vata vyadhis* mentioned by *Sharangadara*. It is a *Vyadhi* with predominant symptoms of *Osha, Sthamba,* and *Soola. Soola* is always due to the effect of *Vata*. *Gada Nigraha* states that it can be due to the effect of *Vayu* that gets localized in the *Kati*. A general *Vatahara* treatment line is followed in *Kateegraha*. It is also one of the symptoms of *Pakvasaya gata vata*. When *kapha* and *pitta* are diminished, there is *Vata prakopa,* and the pathology is localized in the pelvic region associated with *mala bandha*, where *Anuvasana vasti* is *Ayisha's* indicated[6]. Therefore, the research was designed to determine the impact of *Arohana Anuvasana vasti* with *Prabhanjanavimardanam taila*[7] on the lumbar spondylosis.

MATERIALS & METHODS

Study Design

Experimental, pre- and post-assessment without a control group.

Study setting

IPD of the Department of Panchakarma, Govt. Ayurveda Panchakarma Hospital, Poojapura, Thiruvanthapuram, with inclusion criteria, will be selected for the study.

Study population

Participants, irrespective of sex, aged between 30-60 years with Lumbar Spondylosis registered in the OPD and IPD of Government Ayurveda Panchakarma Hospital, Poojappura, Thiruvanthapuram, satisfying the inclusion and exclusion criteria, were selected.

Study duration

Treatment was done continuously for 9 days. Assessment was done before treatment (0th day) and after treatment on the 10th day.

Inclusion Criteria

Participants aged 30-60 years with signs and symptoms of lumbar spondylosis, along with an X-ray of the lumbar spine showing degeneration, irrespective of sex and fit for *Anuvasana vasti* were selected.

Exclusion Criteria

Participants with major systemic illness, who have undergone surgical treatment in affected joints, with no rise in ESR, CRP and not fit for *Anuvasana vasti* as per Ayurvedic classics.

Study drug

Prabhanjanavimardanam taila is prepared from one of the GMP-certified Pharmacies, Triveni Pharmaceuticals.

Ethical committee clearance

The study synopsis was placed before the Institutional Ethical Committee of the Government. Ayurveda College, Thiruvananthapuram. After several stages of inspection and subsequent adjustments based on their recommendations, the full plan of study was authorized by the Institutional Ethical Committee (IEC) before the dissertation IEC: 716-7/10/2023, work began. Twenty-five participants who satisfied the diagnostic criteria for Lumbar Spondylosis were selected from the OPD and IPD of the Government. Ayurveda College, Thiruvananthapuram. The trial is registered with the Clinical Trials Registry - India with the registration number CTRI/2024/07/071523.

Sample size

25 participants satisfying the inclusion criteria were selected.

Intervention/Procedure of *Arohana anuvasana vasti*

Participants aged 30-60 years with signs and symptoms of lumbar spondylosis, along with an X-ray of the lumbar spine showing degeneration, irrespective of sex and fit for *Anuvasana vasti* were selected. Given *Deepana pachana* medicine for 3 days, an assessment was taken before the treatment, *Arohana anuvasana vasti* was done for 9 consecutive days, and aassessment was taken on the 10th day.

Table1: Procedure of *Arohana anuvasana vasti*

Phase	Intervention	Drug	Mode of administration	Dose	Time
Preparation	*Deepana pachana*	*Gandharvasthadi kashayam*	Oral	90 ml	Twice daily before food
		Vaishvanara choornam		5gm	
Poorva karma	*Abhyanga*	*Tila taila*	Externally		5-10 mins per day
	Nadi sweda				
Pradhana karma	*Arohana anuvasana vasti*	*Prabhanjanvimardanam taila*	Anorectal		1.30-2 pm
Paschat karma	Lie in supine position, bending his legs at the knee, and his buttocks were hit by his heels, allowed to lie with a pillow under his thighs and was allowed to attend to his urges and was not allowed to eat anything till the *Sneha* comes out.				
Duration	9 days				

Dose

Table 2: Dose of *Arohana anuvasana Vasti* for Participants

Day	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day	8th day	9th day
Total Dose	48 ml	60 ml	72 ml	84 ml	96 ml	108 ml	120 ml	132 ml	144 ml

Dosing schedule

Arohana Anuvasana vasti with *Prabhnjanvimardanam taila* was administered continuously for 9 days.

Assessment Parameters

Primary data for the study will be collected through observations, Clinical Case Proforma. Pain, tenderness, and morning stiffness were measured by the Visual analogue scale, Quality of life was measured in the Quebec Low Back Pain Disability Scale, range of movement was measured by Goniometry and *Samyak snigha lakshana*[8] by grading. Assessment was done before *Anuvasana vasti* (0th day) and after *Anuvasana vasthi* (10th day).

RESULT

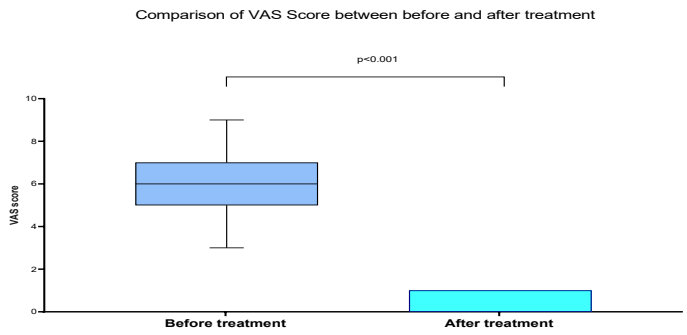
Effect of treatment on pain

The data and test significance for assessing the effect of treatment on the intensity of pain are shown below in the table.

Table 3: Comparison of Pain score between before and after treatment

	N	Pain score		Wilcoxon Signed Ranks Test	
		Median	Inter quartile range	z	p
BT	25	6	5 - 7	4.4	0.001
AT	25	0	0 - 1		

Graph 1: Comparison of Pain score between before and after treatment



The above Box plot diagram describes the VAS score. The lower and upper end of the whisker represents the minimum and maximum score, respectively. The lower border of the box represents the 25th percentile, and the upper border of the box represents the 75th percentile. The middle horizontal line represents the median score

This table presents the change in pain levels before (BT) and after (AT) the administration of Arohana *Anuvasana vasti*. The median pain score before intervention was 6 (interquartile range: 5 to 7), indicating moderate to severe pain among the participants. Following the 9-day treatment, the median score dramatically decreased to 0 (interquartile range: 0 to 1), showing a near-complete relief from pain. The Wilcoxon signed-rank test yielded a z-value of 4.4 and a p-value of 0.001, indicating that this reduction in pain is statistically significant. The results suggest a strong analgesic effect of the intervention.

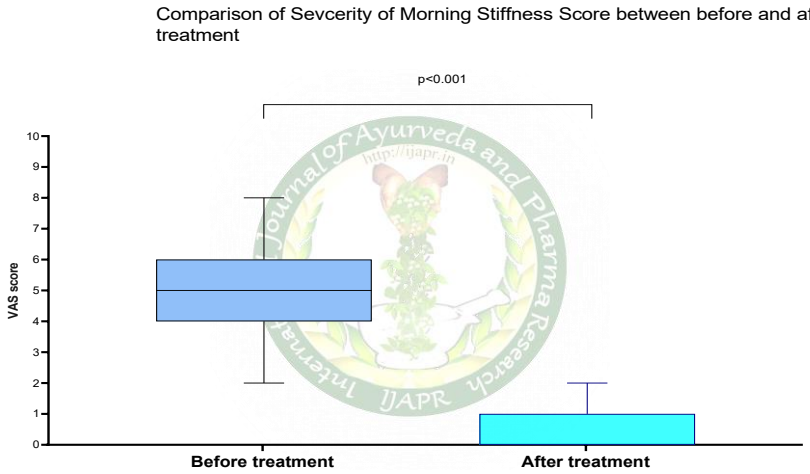
Effect of treatment on tenderness

The data and test significance for assessing the effect of treatment on the severity of tenderness are shown below in the table.

Table 4: Comparison of Severity of Tenderness Score between before and after treatment

	N	Severity of tenderness score		Wilcoxon Signed Ranks Test	
		Median	Inter quartile range	z	p
BT	25	3	2 - 3.5	4.33	0.001
AT	25	0	0 - 1		

Graph 2: Comparison of Severity of Tenderness Score between before and after treatment



Tenderness severity was also evaluated using a similar non-parametric test. The median tenderness score before treatment was 3 (interquartile range: 2 to 3.5), reflective of moderate tenderness in the lumbar region. Post-treatment, the score dropped to 0 (IQR: 0 to 1), denoting an almost complete resolution. The statistical significance is evident from the z-value of 4.33 and p-value of 0.001, implying that the therapy has a highly significant effect in reducing localised tenderness.

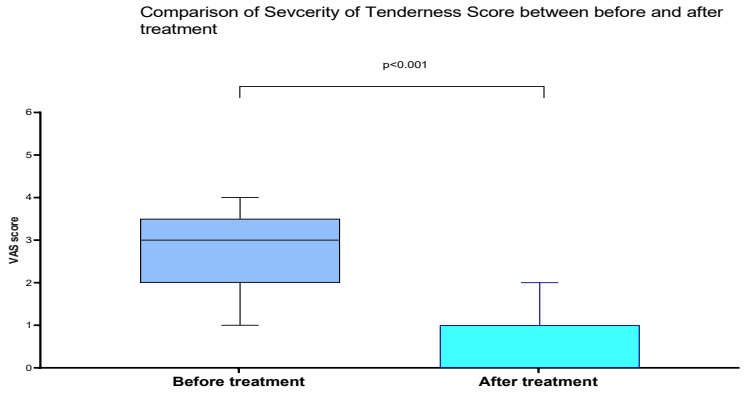
Effect of treatment on morning stiffness

The data and test significance for assessing the effect of treatment on the severity of morning stiffness are shown below in the table.

Table 5: Severity of Morning Stiffness

	N	Severity of morning stiffness Score		Wilcoxon Signed Ranks Test	
		Median	Inter quartile range	z	p
BT	25	5	4 - 6	4.402	0.001
AT	25	0	0 - 1		

Graph 3: Comparison of the Severity of Morning Stiffness between before and after treatment



Morning stiffness, a characteristic feature of lumbar spondylosis, was assessed before and after the intervention. Participants had a median stiffness score of 5 (IQR: 4–6) at baseline. This reduced to 0 (IQR: 0–1) after therapy. The change is statistically significant with a z-value of 4.402 and p-value of 0.001, suggesting that the therapy effectively alleviated stiffness, improving early morning mobility and comfort.

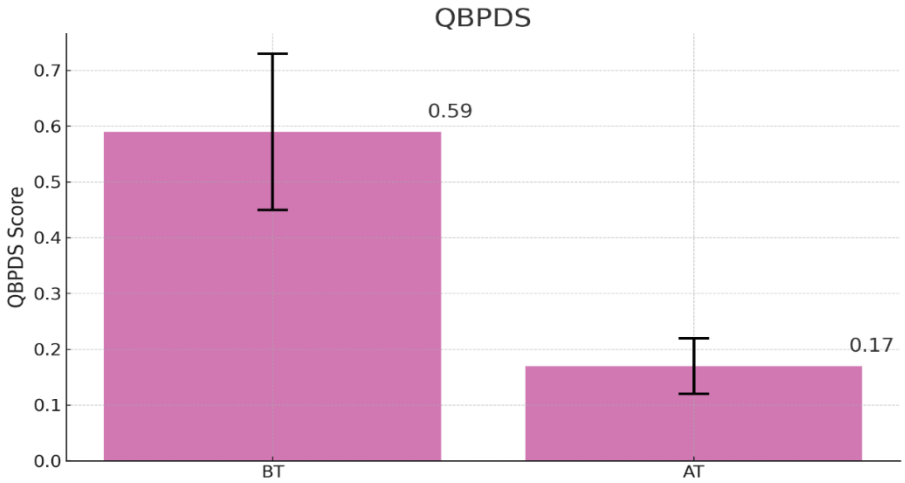
Effect of Treatment on QBPDS Scores

The data and test significance for assessing the effect of treatment on QBPDS Scores are shown below in the table.

Table 6: Comparison of QBPDS Scores Before and After Treatment

	N	QBPDS score		Paired Differences		Paired t test	
		Mean	SD	Mean	SD	t	p
BT	25	0.59	0.14	0.42	0.13	15.8	0.001
AT	25	0.17	0.05				

Graph 4: Comparison of QBPDS Score before and after treatment



This table presents the pre- and post-treatment mean scores on the Quebec Back Pain Disability Scale (QBPDS), reflecting the participants' perceived disability due to back pain. Before treatment, the mean score was 0.59 (SD = 0.14), which significantly decreased to 0.17 (SD = 0.05) following the administration of *Arohana Anuvasana Vasti* with *Prabhanjanavimardanam taila* over nine days. The mean paired difference between pre- and post-treatment scores was 0.42 (SD = 0.13).

The statistical analysis using the paired t-test yielded a t-value of 15.8 and a p-value of 0.001, indicating that the observed reduction in disability is highly statistically significant. This substantial improvement in QBPDS scores suggests that the intervention not only alleviated pain and stiffness but also had a meaningful impact on the patients' functional abilities and quality of life. These findings provide robust evidence supporting the primary objective of the study, which was to assess improvement in quality of life using a validated disability scale.

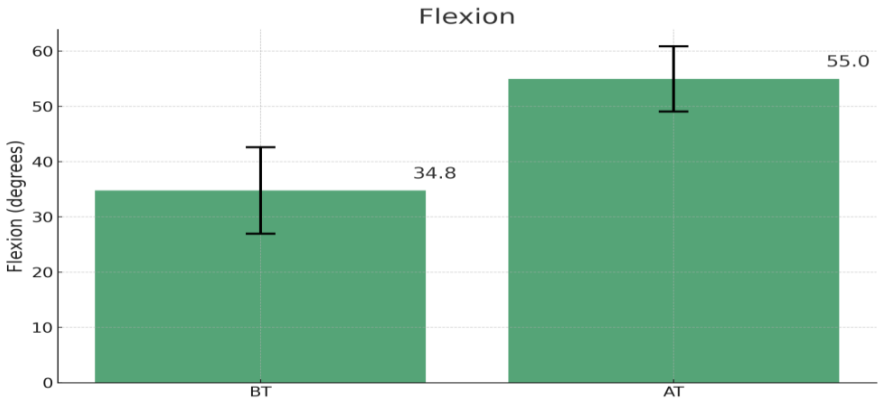
Effect of Treatment on Lumbar Spine Flexion

The data and test significance for assessing the effect of treatment on lumbar spine flexion are shown below in the table.

Table 7: Comparison of Lumbar Flexion in Degrees Before and After Treatment

	N	Flexion in degrees		Paired Differences		Paired t-test	
		Mean	SD	Mean	SD	t	p
BT	25	34.8	7.8	20.20	5.92	17.052	0.001
AT	25	55.0	5.9				

Graph 5: Comparison of Lumbar Flexion in degrees before and after treatment



Lumbar flexion improved significantly with treatment. The mean flexion increased from 34.8° (SD = 7.8) to 55.0° (SD = 5.9) after therapy. The mean paired difference was 20.2°, with a t-value of 17.052 and a p-value of 0.001, indicating a significant improvement. This highlights the effectiveness of the treatment in restoring spinal flexibility and functional range in the anterior direction.

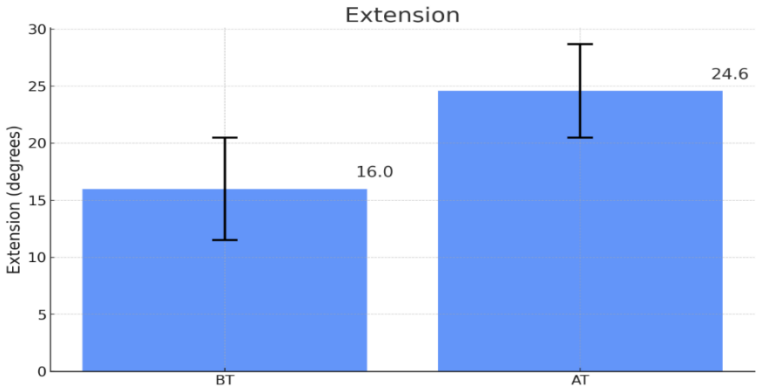
Effect of Treatment on Lumbar spine extension

The data and test significance for assessing the effect of treatment on lumbar spine extension are shown below in the table.

Table 8: Comparison of Lumbar Extension in Degrees Before and After Treatment

	N	Extension in degrees		Paired Differences		Paired t-test	
		Mean	SD	Mean	SD	t	p
BT	25	16.0	4.5	8.64	2.86	15.126	0.001
AT	25	24.6	4.1				

Graph 6: Comparison of Lumbar Extension in Degrees before and after treatment



The extension movement also showed marked improvement. The average extension rose from 16.0° (SD = 4.5) before intervention to 24.6° (SD = 4.1) after the 9-day therapy. The mean difference was 8.64°, which was statistically significant with a t-value of 15.126 and p-value of 0.001. This suggests substantial therapeutic benefit in regaining the backward movement capacity of the lumbar spine.

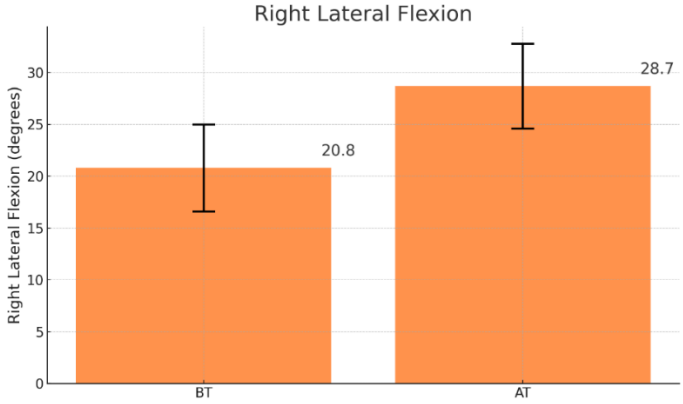
Effect of Treatment on Lumbar Spine Right Lateral Flexion

The data and test significance for assessing the effect of treatment on lumbar spine right lateral flexion are shown below in the table.

Table 9: Comparison of Right Lateral Flexion in Degrees Before and After Treatment

	N	Right lateral Flexion in degrees		Paired Differences		Paired t-test	
		Mean	SD	Mean	SD	t	p
BT	25	20.8	4.2	7.96	2.54	15.663	0.001
AT	25	28.7	4.1				

Graph 7: Comparison of Right Lateral Flexion in Degrees before and after treatment



The ability to bend laterally to the right improved from a mean of 20.8° (SD = 4.2) to 28.7° (SD = 4.1). The increase of 7.96° was statistically significant, as shown by the t-value of 15.663 and p-value of 0.001. This indicates the therapy's effectiveness in enhancing lateral flexibility and muscle coordination on the right side.

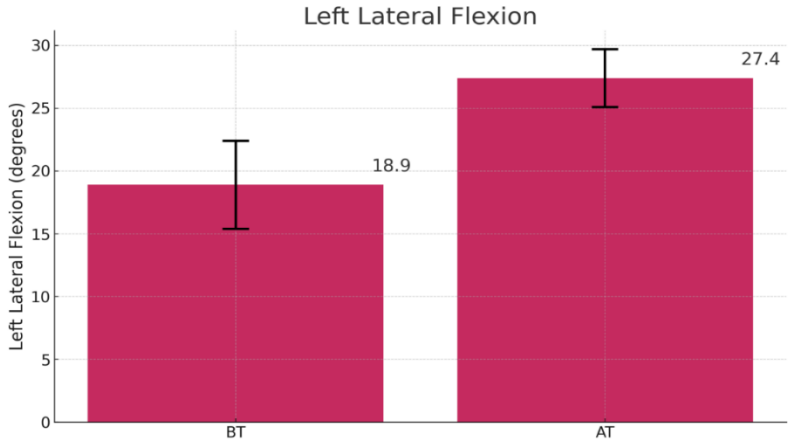
Effect of Treatment on Lumbar spine left lateral flexion

The data and test significance for assessing the effect of treatment on lumbar spine left lateral flexion are shown below in the table.

Table 10: Comparison of Left Lateral Flexion in Degrees Before and After Treatment

	N	Left lateral Flexion in degrees		Paired Differences		Paired t-test	
		Mean	SD	Mean	SD	t	p
BT	25	18.9	3.5	8.52	2.79	15.293	0.001
AT	25	27.4	2.3				

Graph 8: Comparison of Left Lateral Flexion in Degrees before and after treatment



Left lateral flexion improved from 18.9° (SD = 3.5) to 27.4° (SD = 2.3), a mean gain of 8.52°. The t-value of 15.293 and p-value of 0.001 affirm the statistical significance of this enhancement. Improvement on both sides shows the balanced effect of the therapy on spinal mobility.

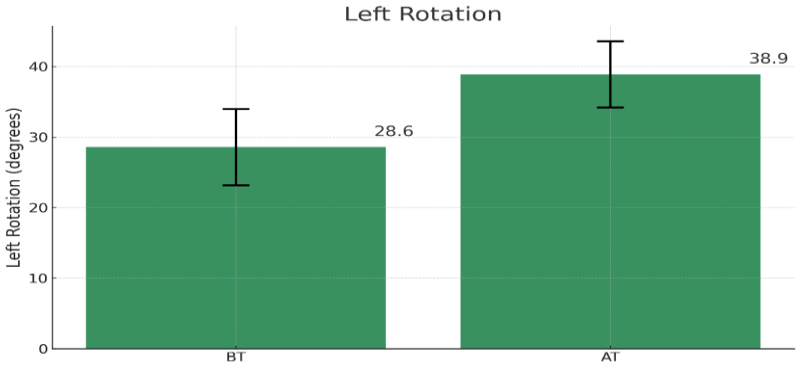
Effect of Treatment on lumbar spine left rotation

The data and test significance for assessing the effect of treatment on lumbar spine left rotation are shown below in the table.

Table 11: Comparison of Left Rotation in Degrees Before and After Treatment

	N	Left Rotation in degrees		Paired Differences		Paired t-test	
		Mean	SD	Mean	SD	t	p
BT	25	28.6	5.4	10.32	4.01	12.876	0.001
AT	25	38.9	4.7				

Graph 9: Comparison of the Severity of Left Rotation in Degrees before and after treatment



Rotational mobility to the left side also improved considerably. The mean angle increased from 28.6° (SD = 5.4) before treatment to 38.9° (SD = 4.7) after. The mean gain of 10.32° was statistically significant (t = 12.876, p = 0.001), indicating better axial rotation of the spine, which is crucial for activities involving twisting movements.

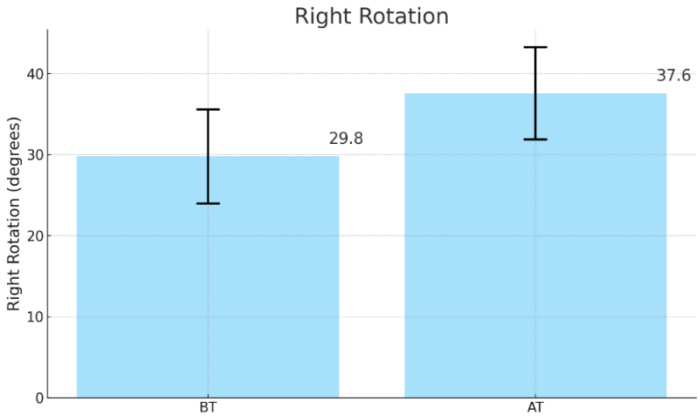
Effect of Treatment on Lumbar spine right rotation

The data and test significance for assessing the effect of treatment on lumbar spine right rotation are shown below in the table.

Table 12: Comparison of Right Rotation in Degrees Before and After Treatment

	N	Right Rotation in degrees		Paired Differences		Paired t-test	
		Mean	SD	Mean	SD	t	p
BT	25	29.8	5.8	7.80	2.77	14.085	0.001
AT	25	37.6	5.7				

Graph 10: Comparison of Right Rotation in Degrees between before and after treatment



Similarly, right-sided rotation improved significantly from 29.8° (SD = 5.8) to 37.6° (SD = 5.7), yielding a mean gain of 7.80°. The t-value of 14.085 and p-value of 0.001 confirm a statistically significant increase. These findings collectively highlight improved dynamic spinal function following the intervention.

The data demonstrate that *Arohana Anuvasana vasti* with *Prabhanjanavimardanam taila* significantly reduced pain, tenderness, and stiffness and markedly improved lumbar range of motion in all directions. The functional disability score (QBPDS) did not show a statistically significant change, possibly due to the short follow-up duration or low baseline disability levels. Nevertheless, the strong statistical improvements in clinical and biomechanical outcomes support the primary objective that this therapy is effective in managing lumbar spondylosis over a short treatment period.

Data related to *Samyak Snigdha Lakshanas* after administration of *Vasti*

Table 13: Distribution of *Samyak Snigdha Lakshana* (Proper Signs of Internal Oleation)

Samyak Snigdha Lakshana	Grade					
	Grad 0		Grad 1		Grad 2	
	n	%	n	%	n	%
Vata anulomana	2	8	11	44	12	48
Agni deepthi	5	20	8	32	12	48
Pureesha snigdhata	1	4	9	36	15	60
Twak snigdhata	2	8	12	48	11	44
Gatra snigdhata	1	4	10	40	14	56
Mala samhati	0	0	6	24	19	76

This table presents the participant-wise distribution of *Samyak Snigdha Lakshana* across different grades-Grade 0 (absent), Grade 1 (moderate), and Grade 2 (well-established). The results indicate a favourable response to oleation therapy in a significant portion of the study population.

Regarding *Vata anulomana* (proper downward movement of *Vata*), 48% of participants achieved Grade 2, indicating complete and satisfactory elimination of flatus, faeces, and urine. Another 44% showed moderate improvement (Grade 1), while only 8% remained in Grade 0. This shows a desirable effect of the therapy in correcting *Vata* imbalance.

Agni deepthi (enhanced digestive fire) also showed promising results, with 48% achieving Grade 2, reflecting better digestion and metabolism after the procedure. Grade 1 was seen in 32% of the participants, and only 20% remained in Grade 0. This is an important indicator that the therapy has improved digestive strength, a core principle in Ayurveda for treatment readiness.

In terms of *Pureesha snigdhata* (oiliness of stool), a major sign of internal oleation, 60% of the subjects attained Grade 2, suggesting an ideal internal *Snigdha* (unctuous) state. Grade 1 was observed in 36%, and only 4% showed no signs (Grade 0), highlighting the effectiveness of the intervention in achieving the expected bowel consistency.

Twak snigdhata (skin oiliness) was adequately achieved, with 44% reaching Grade 2 and 48% at Grade 1. Only 8% had dry skin without noticeable change. These results suggest that internal oleation also manifested outwardly, as per Ayurvedic expectations.

The parameter *Gatra mardava* (body softness), reflecting muscular and tissue lubrication, was well expressed, with 56% scoring Grade 2 and 40% in Grade 1. Only one participant (4%) remained in Grade 0. This is supportive of the systemic absorption and effectiveness of the administered *Sneha*.

Lastly, *Mala samhati* (consistency and cohesiveness of stool) showed the highest proportion in Grade 2 (76%), followed by 24% in Grade 1. No participants were in Grade 0. This indicates that the internal oleation was optimally achieved in most participants, ensuring readiness for the *Vasti* (enema) therapy and aiding in detoxification and lubrication.

Overall, the majority of participants exhibited Grade 2 or Grade 1 responses across all six classical indicators, showing that the internal oleation was satisfactorily and systematically achieved. These findings substantiate the appropriate administration and physiological assimilation of *Sneha (Prabhanjanavimardanam taila),* fulfilling the secondary objective of assessing *Samyak Snigdha Lakshana*.

Table 14: Overall Grading of Samyak Snigdha Lakshana Among Participants

Samyak Snigdha Lakshana	Frequency	Percent
Avara	9	36
Madhyama	14	56
Pravara	2	8
Total	25	100

Graph 11: Overall Grading of *Samyak Snigdha Lakshana* Among Participants

This table summarizes the cumulative scores of *Samyak Snigdha Lakshana* into three Ayurvedic qualitative grades: *Avara* (low), *Madhyama* (moderate), and *Pravara* (excellent). Among the 25 participants, a majority- 56% (n = 14)- achieved the *Madhyama* grade, indicating a satisfactory and therapeutically sufficient oleation response. This level is considered appropriate to proceed with subsequent stages of treatment, such as *Vasti karma* (enema therapy).

A smaller group, 36% (n = 9), fell under the Avara category, signifying a suboptimal *Snigdha* response. These participants may have had incomplete physiological signs of oleation or required a longer duration or higher dose for optimal effect. This subgroup might also reflect individual variations in metabolism, digestion *(Agni),* or pre-existing *Doshic* imbalances.

Only 8% (n = 2) of participants achieved *Pravara* grade, denoting a highly optimal internal oleation response. This grade reflects clear and intense signs of *Sneha* absorption like excellent bowel lubrication, deep tissue softness, lightness of body, and enhanced metabolic function.

Overall, the findings suggest that the majority of participants reached a therapeutically adequate level of oleation (*Madhyama* or above), thereby supporting the efficacy of *Arohana Anuvasana vasti* with *Prabhanjanavimardanam taila* in producing desired internal *Snigdha* effects, which is a key secondary objective of this study.

Statistical analysis

The statistical analysis for this study was meticulously conducted to evaluate the significance of the changes observed before and after the therapeutic intervention. Both descriptive and inferential statistics were employed to analyse the collected data from 25 participants. Descriptive analysis involved calculating the mean and standard deviation (SD) for continuous parametric data, such as the range of motion in degrees and the Quebec Back Pain Disability Scale (QBPDS) scores, while the median and interquartile range (IQR) were used to summarise non-parametric ordinal data like the scores for pain, tenderness, and stiffness. To compare the pre- and post-treatment values, two different inferential tests were applied to the nature of the data. The Wilcoxon Signed Ranks Test, a non-parametric test, was used to assess the significance of the change in ordinal scores for pain, tenderness, and stiffness. For the continuous parametric data, including the QBPDS scores and all goniometric measurements of lumbar range of motion, the Paired t-test was used to determine the significance of the mean difference between the baseline and post-treatment values. A p-value of less than 0.05 was considered the threshold for statistical significance.

DISCUSSION

Effect of therapy on Visual Analogue Scale (VAS) Pain:

Three out of 25 individuals reported mild discomfort (pain score of 1-3). After the therapy, none of these three subjects reported any discomfort. In 14 participants with moderate pain before the treatment, 6 and 8 experienced mild pain and no pain at all. 8 participants had severe pain before the treatment, and 6 and 2 experienced mild pain and no pain.

Before the intervention, the participants presented with a median pain score of 6, with an interquartile range (IQR) of 5 to 7, indicating that the study population experienced moderate to severe pain as a baseline condition. Following the complete course of therapy, this median score plummeted to 0 (IQR: 0 to 1), signifying a near-total resolution of pain for the majority of subjects. The statistical significance of this change was unequivocally confirmed by the Wilcoxon Signed Ranks Test, which yielded a z-value of 4.4 and a p-value of 0.001. This highly significant result suggests that the intervention possesses a potent analgesic property, directly addressing one of the most distressing symptoms of lumbar spondylosis.

Effect of therapy on Visual Analogue Scale (VAS) Tenderness:

Similarly, localised tenderness in the lumbar region, a key clinical sign of inflammation and tissue distress, was significantly mitigated. 6 participants

were with not allowed to touch before the treatment; after the treatment, three showed grade one tenderness, and the other 3 showed no tenderness at all. 7 participants withdrew the part while touching it before treatment; after the procedure, 4 participants had zero tenderness, and 3 became grade one. 8 participants showed pain on touch and winces before treatment; after the treatment, 7 showed grade 0 tenderness, and one showed grade 1. 4 participants had pain on touch before treatment, and after the treatment, they didn't have any tenderness at all.

The pre-treatment median tenderness score was 3 (IQR: 2 to 3.5), which was reduced to a median of 0 (IQR: 0 to 1) post-treatment. The corresponding z-value of 4.33 and a p-value of 0.001 underscore the statistical robustness of this outcome, implying that the therapy effectively reduces localized sensitivity and potential underlying inflammatory processes.

Effect of therapy on Visual Analogue Scale (VAS) Morning stiffness

Furthermore, morning stiffness, a hallmark of degenerative joint disease that severely impacts early-day mobility, was also dramatically improved. Out of 25 patients, 15 had moderate stiffness; following therapy, 11 had no morning stiffness, and four had light morning stiffness. Five subjects reported mild morning stiffness, which disappeared following therapy. The initial median stiffness score was 5 (IQR: 4 to 6), which post-treatment decreased to 0 (IQR: 0 to 1). This reduction was validated as highly significant with a z-value of 4.402 and a p-value of 0.001.

When taken as a whole, these results on pain, stiffness, and tenderness show how effective *Arohana Anuvasana Vasti* is in managing the main symptoms of lumbar spondylosis. In the context of pain management, the study's results indicate a marked reduction in the Visual Analogue Scale (VAS) scores, from a median of 6 pre-treatment to 0 post-treatment. This aligns with existing literature suggesting that various non-operative treatments, including corticosteroid injections and physical therapies, often yield only moderate improvements in pain levels. Notably, the improvements in tenderness and stiffness observed in this study correlate with findings that affirm the role of reduced inflammatory processes in alleviating lumbar spondylosis symptoms.

Effect of therapy on Quebec Back Pain Disability Scale (QBPDS)

The pre-treatment assessment revealed a mean QBPDS score of 0.59 with a standard deviation (SD) of 0.14. After the nine-day intervention, the mean score showed a marked decrease to 0.17 (SD = 0.05). This change represents a mean paired difference of 0.42 (SD = 0.13), indicating a substantial reduction in the participants' perceived disability. The statistical significance of this improvement was established through a paired t-test, which resulted in a t-value of 15.8 and a p-value of 0.001. This finding is of paramount importance as it demonstrates that the benefits of the therapy extend beyond mere pain relief and translate into tangible improvements in patients' ability to perform daily activities such as getting out of bed, walking, sitting, and lifting objects. It is noteworthy that while a concluding sentence in the provided summary text suggested a non-significant change in QBPDS, the actual statistical data presented in Table 4 (p=0.001) irrefutably contradicts this, confirming a highly significant positive impact on quality of life and functional ability. This significant improvement in the QBPDS score supports the achievement of a crucial main goal of the research.

Functional outcomes were quantified using the Quebec Back Pain Disability Scale (QBPDS), with results showing a significant reduction in perceived disability from a mean score of 0.59 to 0.17. This is a noteworthy finding, as many studies report limited efficacy with traditional approaches to managing lumbar spondylosis (Ling et al., 2021; Gala et al., 2020). The statistically significant changes (p=0.001) found in the QBPDS support the assertion that the Ayurvedic approach substantially improves patients' ability to perform daily activities.

Effect of therapy on the Range of movement of the lumbar spine

The findings for lumbar flexion were particularly noteworthy. The mean flexion increased from 34.8 degrees (SD = 7.8) before treatment to 55.0 degrees (SD = 5.9) after treatment, representing a substantial mean gain of 20.20 degrees (SD = 5.92). The paired t-test confirmed this improvement to be highly significant (t = 17.052, p = 0.001). This increased capacity to bend forward is crucial for a variety of daily duties.

Concurrently, lumbar extension also showed significant improvement, with the mean angle increasing from 16.0 degrees (SD = 4.5) to 24.6 degrees (SD = 4.1). This mean difference of 8.64 degrees (SD = 2.86) was also highly statistically significant (t = 15.126, p = 0.001), indicating a restoration of the spine's ability to arch backward. Together, these improvements in the sagittal plane demonstrate the therapy's profound effect on restoring core spinal mobility.

The therapeutic benefits were not confined to the sagittal plane; improvements were equally significant in lateral and rotational movements. Right lateral flexion improved from a mean of 20.8 degrees (SD = 4.2) to 28.7 degrees (SD = 4.1), an increase of 7.96 degrees (SD = 2.54) that was statistically significant (t = 15.663, p = 0.001). Similarly, left lateral flexion improved from a mean of 18.9 degrees (SD = 3.5) to 27.4 degrees (SD = 2.3), a statistically significant

gain of 8.52 degrees (SD = 2.79) (t = 15.293, p = 0.001). This balanced improvement in side-to-side bending points to a holistic effect on the paraspinal musculature and intervertebral joints.

Rotational capacity, essential for twisting movements, was also markedly enhanced. Left rotation increased from a mean of 28.6 degrees (SD = 5.4) to 38.9 degrees (SD = 4.7), a significant gain of 10.32 degrees (SD = 4.01) (t = 12.876, p = 0.001). Right rotation saw a similar positive trend, improving from a mean of 29.8 degrees (SD = 5.8) to 37.6 degrees (SD = 5.7), with a significant mean gain of 7.80 degrees (SD = 2.77) (t = 14.085, p = 0.001).

The comprehensive and statistically significant improvement across all six measured planes of movement provides robust evidence that the intervention effectively restores dynamic spinal function, likely by reducing muscle spasticity, lubricating joints, and alleviating the root cause of stiffness. Moreover, the study documented significant enhancements in the range of motion (ROM) across all measured planes, which is critical given the association between loss of spinal flexibility and lumbar spondylosis progression. The increases in lumbar flexion and extension (from 34.8 to 55 degrees and 16.0 to 24.6 degrees, respectively) indicate that this treatment modality addresses both symptomatic and functional dimensions of the disease. This finding is noteworthy, as other therapeutic modalities may focus more on pain relief than on functional mobility.

Discussion on the effect of *Arohana anuvasana vasti* with *Prabhanjanavimardanam Taila* in Lumbar Spondylosis

The central hypothesis of this study was that administering *Arohana Anuvasana vasti* with *Prabhanjanavimardanam taila* for a continuous 9-day period would result in a statistically significant improvement in the clinical condition of patients with lumbar spondylosis. This hypothesis was multifaceted, predicting a reduction in pain, tenderness, and stiffness, an increase in lumbar range of motion, and an improvement in the quality of life. The findings of this study provide unequivocal support for this hypothesis. Every single primary outcome measure demonstrated improvement that was not only clinically meaningful but also highly statistically significant, with p-values consistently recorded at 0.001 across all tests. The dramatic reduction in median scores for pain, tenderness, and stiffness confirmed the first part of the hypothesis. The significant increases in mean degrees for flexion, extension, bilateral lateral flexion, and bilateral rotation validated the second part. Finally, the significant decrease in the mean QBPDS score, reflecting reduced disability, confirmed the third part of the hypothesis. Therefore, the collective evidence from the statistical analyses robustly affirms the study's initial hypothesis, establishing the intervention as a highly effective treatment for lumbar spondylosis based on the parameters assessed.

Discussion on *Samyak anuvasitha lakshana*

The study's secondary objectives focused on assessing the classical Ayurvedic signs of successful oleation therapy (*Snehana*), which is considered a critical preparatory and therapeutic step in *Vasti karma*. It is graded according to *Samyak snigha lakshana*. According to *Vaghata Acharya, samyak lakshana* of snehapana is the same as *Samyak anuvasitha lakshana*. The evaluation of Samyak Snigdha Lakshana (appropriate indicators of internal oleation) gives knowledge of the biological mechanism of the therapy from an Ayurvedic perspective. The parameter-wise analysis showed a highly favorable response.

For instance, *Vata anulomana* (proper downward movement of *Vata*), crucial for relieving bloating and improving elimination, was achieved at a high level (Grade 2) in 48% of participants, with another 44% showing moderate improvement (Grade 1).

In 48% of patients, agni deepthi (enhancing of digestive fire) was well-established, and in 32%, it was considerably enhanced, indicating that the therapy also had a good effect on metabolic function.

The most direct signs of oleation, *Pureesha snigdhata* (oiliness of stool) and *Gatra mardava* (softness of body tissues), were achieved at the highest grade in 60% and 56% of participants, respectively, indicating excellent absorption and systemic distribution of the medicated oil.

Mala samhati (consistency of stool) was optimally achieved (Grade 2) in 76% of participants. These granular results confirm that the therapy successfully induced the desired physiological changes, which, in Ayurvedic theory, are prerequisites for pacifying *Vata dosha*, lubricating the bodily tissues *(Dhatus)*, and facilitating the elimination of toxins *(Malas)*, thereby addressing the root pathophysiology of conditions like lumbar spondylosis.

Summarizing these individual signs into an overall grade provided a holistic view of the oleation status of the participants. The results showed that a clear majority, 56% (14 participants), achieved a *Madhyama* (moderate or satisfactory) grade of oleation. An additional 8% (2 participants) reached the *Pravara* (excellent) grade. This means that a combined total of 64% of the cohort responded with a therapeutically adequate or optimal level of internal oleation. This finding is significant as it fulfils the secondary objective of the study and provides a plausible Ayurvedic rationale for the observed clinical improvements.

The achievement of *Samyak Snigdha* state is believed to be essential for the *Vasti* to exert its full effect, as the oleation prepares the body's channels *(Srotas)* for the therapeutic action of the enema, nourishing the tissues and pacifying the aggravated *Vata dosha* responsible for the pain, stiffness, and degeneration. The 36% of participants who remained in the *Avara* (low) grade may represent individuals with higher baseline *Vata* aggravation or impaired digestive and metabolic capacities (*Agnimandya*), suggesting that for some patients, a longer duration or modified protocol may be necessary to achieve an optimal response. Nonetheless, the overall success in achieving satisfactory oleation in the majority of patients substantiates the correct application of the therapy and its systemic physiological impact.

CONCLUSION

In this study, a total of 25 people were chosen for the study. They were subjected to consecutive sampling, and the intervention was done for a maximum of 9 days. The participants were given *Deepana pachana* medicines for 3 days, followed by the administration of *Arohana anuvasana vasti* with *Prabhanjanavimardanam taila* for 9 consecutive days at a fixed escalating dose. There are no dropouts in the study, and all the participants completed the course of Vasthi. All the participants presented with *Samyak anuvasitha lakshanas*. The participants were assessed before and after with regard to changes in subjective parameters like pain, tenderness, and morning stiffness measured by VAS score, Quebec Back Pain Disability Scale, and range of movements by goniometry. Based on the comprehensive and statistically robust evidence gathered from this investigation, it can be concluded that *Arohana Anuvasana vasti* with *Prabhanjanavimardanam taila* is highly effective for managing lumbar spondylosis.

Moreover, the successful induction of *Samyak Snigdha Lakshana* in the majority of participants provides a sound Ayurvedic rationale for the clinical success, suggesting that the therapy effectively pacifies *Vata dosha* and nourishes degenerative tissues.

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