Original Article

Effect of *Agnikarma* (therapeutic heat burns) and *Raktamokshana* (therapeutic bloodletting) in the management of *Kati Sandhigata Vata* (lumbar spondylosis)

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Abstract

Background: *Agnikarma* (therapeutic heat burns) and *Raktamokshana* (therapeutic bloodletting) are the treatment modalities mentioned in Ayurveda texts to combat the clinical condition of *Sandhigata Vata* (osteoarthritis) which occurs due to provoked *Vata Dosha* and/or *Vyana Vayu* overlapped with *Kapha.* Lumbar spondylosis is a degenerative disorder presenting with lower back pain, stiffness, numbness, difficulty in movement etc., with evidence of osteophytes and reduced disc height in plain film radiograph. **Aims and Objectives:** The aim of the study was to evaluate the role of *Agnikarma* and *Raktamokshana* in the management of *Kati Sandhigata Vata* (lumbar spondylosis). **Materials and Methods:** After obtaining CTRI registration, total 32 cases of lumbar spondylosis were registered and allocated into two groups by simple random sampling method. 16 patients were treated with *Agnikarma* with *Panchadhatu Shalaka* (group A) and 16 patients were treated with *Raktamokshana* by modified *Shringa Yantra* (group B). **Results:** The result was assessed using the Wilcoxon signed-rank test and paired *t*-test. Significant results were observed in relieving lower back pain, stiffness, numbness and painful movements in both the groups. **Conclusion:** *Agnikarma* was found more effective in relieving pain and numbness in lower back and *Raktamokshana* was found better in relieving pain and stiffness of lower back.

Keywords: *Agnikarma*, *Kati Sandhigata Vata,* lumbar spondylosis, *Raktamokshana*

Introduction

Low back pain is a common clinical presentation of musculoskeletal disorders due to spinal pathology and lumbar spondylosis is responsible for about 10% of all back pain. It is characterized by progressive loss of function and painful lumbar joint movements.

Kati Sandhigata Vata is a clinical condition that takes place due to *Dhatukshaya* (degenerative pathology) and/or *Margaavarana* (obstructive pathology). Considering the sign and symptoms of *Kati Sandhigata Vata* such as *Katishoola* (low back pain), *Katisuptata* (low back numbness), *Akunchana Prasarane Pravrutti Savedana* (painful joint movements) and *Katistambha* (low back stiffness), it can be correlated with lumbar spondylosis.

Dependency on anti-inflammatory drugs, physiotherapy and surgical management are the treatment options for the patients of lumbar spondylosis. Complications of which include nausea, vomiting, obesity, high reoccurrence rate, and osteomyelitis. *Agnikarma* (therapeutic heat burns) and *Raktamokshana* (therapeutic bloodletting) are non pharmacological treatment modalities for the management of *Asthi Sandhigata Vata* (osteoarthritis).[1,2] Hence, this study was carried out to evaluate the clinical effect of *Agnikarma* and *Raktamokshana* in the management of *Kati Sandhigata Vata* (lumbar spondylosis).

Hypothesis

- Null hypothesis (H_0): *Agnikarma* (therapeutic heat burns) and *Raktamokshana* (therapeutic bloodletting) are having equal effect in the management of *Kati Sandhigata Vata*

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- Alternative hypothesis (H_1): Either of *Agnikarma* (therapeutic heat burns) and *Raktamokshana* (therapeutic bloodletting) has better effects in the management of *Kati Sandhigata Vata*.

Aims and objectives

The study was aimed to evaluate and compare the effect of *Agnikarma* and *Raktamokshana* in the management of *Kati Sandhigata Vata* (lumbar spondylosis).

Material and Methods

It was an open-label prospective comparative clinical study. After CTRI registration (CTRI/2015/12/006449) of the study, total 32 patients fulfilling the clinical criteria of *Kati Sandhigata Vata* (lumbar spondylosis) were enrolled for the study irrespective of their demographic divisions and allocated in two groups (group A and group B) by computer generated simple randomization. As per group division, group A patients to were selected for *Agnikarma* and group B patients to were selected for *Raktamokshana*.

Diagnostic criteria

Patients having the clinical picture of progressive loss of spinal function, stiffness, back pain or/and numbness with confirmative degenerative changes on X-rays of lumbar spine (anterio-posterior (AP view) and lateral view) [Figure 1] and fulfilling the Kellegrane and Lawrance Scale were enrolled for the study. Detailed physical examination was carried out to assess the decreased range of movement. Hemoglobin percentage, total leukocyte count, differential count, erythrocyte sedimentation rate, serum calcium, fasting blood sugar and urine routine and microscopic examinations were carried out before and after the treatment to assess status of the patient.

Inclusion criteria

Patients suffering from *Kati Sandhigata Vata* (lumbar spondylosis) from the age group of 40–70 years of either sex were selected.

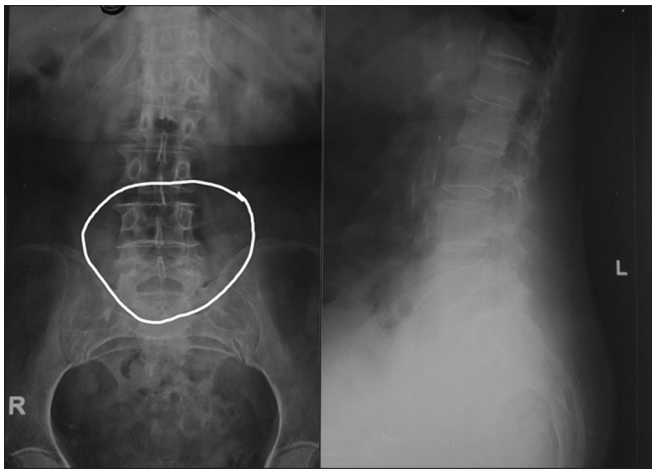

Figure 1: X-rays of lumbar spine (anterio-posterior i.e. AP view and lateral view)

Exclusion criteria

Patients suffering from uncontrolled diabetes mellitus, rheumatoid arthritis positive or any other autoimmune diseases, pregnancy, paralysis, parkinson's disease, severe anemia, malignancy, protrusion of lumbar disc and prolapsed inter-vertebral disc were excluded from this study.

Materials for Agnikarma (therapeutic heat burns)

Panchadhatu Shalaka (therapeutic heat burns tool)[3], fine powder of turmeric (*Curcuma longa* Linn.), Aloevera pulp, *Mudga Yusha* (green gram soup) and povidone iodine (anti-septic solution) were collected for performing *Agnikarma* therapy.

Materials for Raktamokshana

Raktamokshana (therapeutic bloodletting) instrument (modified *Shringa Yantra*), disposable sterile needle no. 24, kidney tray, honey, sesame oil were collected for *Raktamokshana* procedure.

Methodology

Group A: Total 16 diagnosed cases of *Kati Sandhigata Vata* were treated with *Agnikarma.* The total duration of treatment was 25 days in this group.

Pre-operative procedure

- *Mudga Yusha* (green gram soup) was given to patients for initial 3 days twice a day for diet. Diet other than that was avoided
- Informed written consent was taken for the procedure from each patient
- Site demarcation for *Agnikarma* procedure was done by local examination or by presence of osteophytes in plain film radiograph [Figure 1]
- Instruments and equipments were sterlized for *Agnikarma* procedure and *Panchadhatu Shalaka* was heated up to red hot [Figures 2-3].

Operative procedure:

- Patient was advised to lie in prone position
- Local site was cleaned with antiseptic solution

Figure 2: Tray prepared for *Agnikarma*

- *Agnikarma* was done with the help of *Panchadhatu Shalaka* by keeping 0.5-1 cm distance in between each spot(15-20 spots) in demarcated site of lower back[4] [Figure 4]
- Aloevera pulp was applied on *Agnikarma* site just after the cauterization
- Total 15-20 such spots were made by same procedure.

Post operative procedure
- *Haridra Churna* dusting was done on *Agnikarma* site [Figure 5]
- Patients were advised to take rest and to avoid water contact on operated site
- Patients were advised for follow up on 7 days interval.

Group B: Sixteen diagnosed cases of *Kati Sandhigata Vata* were treated with *Raktamokshana* with modified *Shringa Yantra*. The total duration of treatment was 21 days.

Pre-operative procedure:
- *Mudga Yusha* was given to patients for initial 3 days twice a day for food. Food other than that was avoided
- Informed written consent was taken for the procedure from each patient
- Site demarcation for *Raktamokshana* procedure was done by local examination or on the basis of osteophyte in plain film radiograph
- Instruments and equipments were sterlized for *Raktamokshana* procedure [Figures 6].

Operative procedure:
- Patient was advised to take prone position
- Local site was cleaned with antiseptic solution. Sterile fiber cups (modified *Shringa Yantra*) were applied on lower back
- After proper vasodilatation, multiple pricks were made on the area by sterile needle no. 24
- Re-application of fiber cups was done and was removed after complete ceassation of oozing of blood [Figures 7].

Post-operative procedure:
- *Haridra Churna* dusting was done *Raktamokshana* site
- Same procedure was performed at the interval of 15 days
- Patients were advised to take rest and to avoid water contacts on operated site for 24 hours.

Placebo
During the course of treatment, patients were also given one placebo capsule (500mg each; made from wheat flour) twice a day after meal with lukewarm water in both the groups.

Follow-up
After completion of the treatment, patients were advised for follow up on 7 days interval for 1 month.

Figure 3: Heated *Panchadhatu Shalaka*

Figure 4: *Agnikarma* procedure

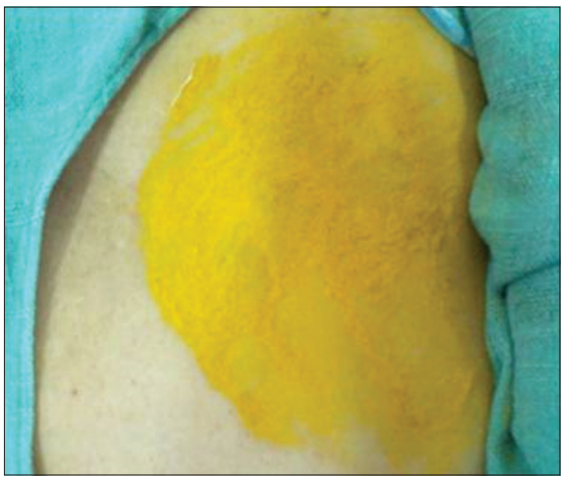

Figure 5: Dusting of *Haridra Churna (turmeric powder)*

Criteria for assessment
Subjective criteria
1. *Katishoola* (pain in low back)

No-pain	0
Bearable pain with or without medication	1
Moderate pain relieved by medication	2
Severe pain with disturbed routine work and relived by strong analgesics	3
Patient cannot tolerate	4

2. *Katistambha* (stiffness of lower back)

No stiffness	0
Stiffness for few minutes after sitting for long duration but relieved by mild movements	1
Stiffness more than 1 hour or more than once in a day but routine work is not disturbed	2
Stiffness lasting for more than 1 hour or many times a day, mildly affecting the daily routine	3
Episodes of stiffness lasting for 2-6 hours, daily routine is hampered severely.	4

3. *Katisuptata* (numbness in lower back)

No numbness	0
Occasionally once in a day for few minutes	1
Daily once in a day for few minutes	2
Daily for 2 or more times/30-60 minutes	3
Daily more than 1 hour/many times a day	4

4. *Akunchana Prasarana Pravrutti Savedana* (painful joint movements).

No restriction of movement.	0
Restriction in any one range of movement.	1
Restriction in any two range of movements.	2
Restriction in any three range of movements.	3
Restriction in all four range of movements.	4

Objective criteria

1. Range of Motion[5]

Forward flexion (normally 80 degree)	
Grade 0: 80 degree	0
Grade 1: 80-50 degree	1
Grade 2: 50-30 degree	2
Grade 3: <30 degree	3
Right lateral flexion: (normally approx.35°)	
Grade 0: 35degree	0
Grade 1:25degree	1
Grade 2: 15 degree	2
Grade 3: <15 degree	3
Left lateral flexion: (normally approx.35°)	
Grade 0: 35degree	0
Grade 1:25degree	1
Grade 2: 15 degree	2
Grade 3: <15 degree	3
Extension: (normally approx.20-30°)	
Grade 0 : 20-30 degree	0
Grade 1: 10-20 degree	1
Grade 2: < 10 degree	2
Rotation towards right: (normally approx.45)	
Grade 0 : 45 degree	0
Grade 1: 30 degree	1
Grade 2: 15 degree	2
Grade 3: <15 degree	3

2. X-ray of the lumbar spine (Kellgren Lawrence Scale)[6]

No radiographic features of OA presentation	0
Doubtful joint space narrowing (JSN) and possible osteophytes lipping	1
Definite osteophytes and possible joint space narrowing on antero-posterior weight bearing radiograph.	2
Multiple osteophytes marked JSN, severe sclerosis and possible bony deformity.	3
Large osteophytes, marked joint space narrowing , severe sclerosis and definite bony deformity	4

3. Visual Analog Scale (VAS)[7]

Pain	Description	Grade	Description
		0	No pain
Mild	Does not interfere with most activities. Able to adopt to pain psychologically and with medications or devices such as cushions	1	Very light, barely noticeable pain. Most of the times patient never think about pain.
		2	Mild pain which is discomforting
		3	Very noticeable pain, but patient groused to it.
Moderate	Interfere with many activities, requires lifestyle changes, but patient remained independent, unable to adapt to pain.	4	Strong deep pain. distressing to patient. Patient notice the pain all the time and cannot completely adapt
		5	Strong deep piercing pain. very distressing to patient. Patient notice the pain all the time and it affects normal lifestyle.
		6	Very strong ,deep piercing pain partially dominating the senses and causing trouble holding a job
Severe	Unable to engage in normal activities. Patient is disabled and unable to function independently	7	Very strong, deep piercing pain.
		8	Very strong, deep piercing pain with severe personality changes if the pain is present for long time
		9	Patient demand pain killers or surgery whatever be the side effects or risks
		10	Unimaginable unspeakable
Mild (0-3)			1
Moderate (4-6)			2
Severe (7-10)			3

4. Oswestry Disability Index (ODI) Scale[8]

Section 1: Pain Intensity

- ☐ I can tolerate the pain I have without having to use pain killers. [0 points]
- ☐ The pain is bad but I manage without taking pain killers. [1 point]
- ☐ Pain killers give complete relief from pain. [2 points]
- ☐ Pain killers give moderate relief from pain. [3 points]
- ☐ Pain killers give very little relief from pain. [4 points]
- ☐ Pain killers have no effect on the pain and I do not use them. [5 points]

Section 2: Personal Care

- ☐ I can look after myself normally without causing extra pain. [0 points]
- ☐ I can look after myself normally but it causes extra pain. [1 point]
- ☐ It is painful to look after myself and I am slow and careful. [2 points]
- ☐ I need some help but manage most of my personal care. [3 points]
- ☐ I need help every day in most aspects of self care. [4 points]
- ☐ I do not get dressed wash with difficulty and stay in bed. [5 points]

Section 3: Lifting

- ☐ I can lift heavy weights without extra pain. [0 points]
- ☐ I can lift heavy weights but it gives extra pain. [1 point]
- ☐ Pain prevents me from lifting heavy weights off the floor but I can manage if they are conveniently positioned for example on a table. [2 points]
- ☐ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned. [3 points]
- ☐ I can lift only very light weights. [4 points]
- ☐ I cannot lift or carry anything at all. [5 points]

Section 4: Walking

- ☐ Pain does not prevent me walking any distance. [0 points]
- ☐ Pain prevents me walking more than 1 mile. [1 point]
- ☐ Pain prevents me walking more than 0.5 miles. [2 points]
- ☐ Pain prevents me walking more than 0.25 miles. [3 points]
- ☐ I can only walk using a stick or crutches. [4 points]
- ☐ I am in bed most of the time and have to crawl to the toilet. [5 points]

Section 5: Sitting

- ☐ I can sit in any chair as long as I like. [0 points]
- ☐ I can only sit in my favorite chair as long as I like. [1 point]
- ☐ Pain prevents me sitting more than 1 hour. [2 points]
- ☐ Pain prevents me from sitting more than 0.5 hours. [3 points]
- ☐ Pain prevents me from sitting more than 10 minutes. [4 points]
- ☐ Pain prevents me from sitting at all. [5 points]

Section 6: Standing

- ☐ I can stand as long as I want without extra pain. [0 points]
- ☐ I can stand as long as I want but it gives me extra pain. [1 point]
- ☐ Pain prevents me from standing for more than 1 hour. [2 points]
- ☐ Pain prevents me from standing for more than 30 minutes. [3 points]
- ☐ Pain prevents me from standing for more than 10 minutes. [4 points]
- ☐ Pain prevents me from standing at all. [5 points]

Section 7: Sleeping (Cont.)

- ☐ Even when I take tablets I have less than 4 hours sleep. [3 points]
- ☐ Even when I take tablets I have less than 2 hours of sleep. [4 points]
- ☐ Pain prevents me from sleeping at all. [5 points]

Section 8: Sex Life

- ☐ My sex life is normal and causes no extra pain. [0 points]
- ☐ My sex life is normal but causes some extra pain. [1 point]
- ☐ My sex life is nearly normal but is very painful. [2 points]
- ☐ My sex life is severely restricted by pain. [3 points]
- ☐ My sex life is nearly absent because of pain. [4 points]
- ☐ Pain prevents any sex life at all. [5 points]

Section 9: Social Life

- ☐ My social life is normal and gives me no extra pain. [0 points]
- ☐ My social life is normal but increases the degree of pain. [1 point]
- ☐ Pain has no significant effect on my social life apart from limiting energetic interests such as dancing. [2 points]
- ☐ Pain has restricted my social life and I do not go out as often. [3 points]
- ☐ Pain has restricted my social life to my home. [4 points]
- ☐ I have no social life because of pain. [5 points]

Section 10: Travelling

- ☐ I can travel anywhere without extra pain. [0 points]
- ☐ I can travel anywhere but it gives me extra pain. [1 point]
- ☐ Pain is bad but I manage journeys over 2 hours. [2 points]

- ☐ Pain restricts me to journeys of less than 1 hour. [3 points]
- ☐ Pain restricts me to short necessary journeys under 30 minutes. [4 points]
- ☐ Pain prevents me from traveling except to the doctor or hospital. [5 points]

5. Schober's test[9]

Distance increases 5cm	0
Distance increases 4cm	1
Distance increases 3cm	2
Distance increases 2cm	3
Distance increases 1cm	4
No change in the distance	5

6. Straight Leg Raise (SLR) test[10]

Equal to or greater than 90	0
71-<90	1
51-70	2
31-50	3
<30	4

7. Lasegue's sign[11]

Positive Negative

Observations and Results

In this study, majority of the patients (56.25%) were reported from 40–49 years age group. Although it is a geriatric age group disease, early age incidence was noticed here due to changed life style.[12] Total 59.38% patients were female. 31.25% patients were having tobacco addiction, whereas 18.75% patients were alcohol addicted. Total 53.13% patients were having irregular sleep. *Ruksha* (degenerative) property of provked *Vata Dosha* due to irregular sleep, excessive consumption of nicotine of tobacco or alcohol contents may have contributed in *Dhatukshaya* (tissue degeneration).

Total 75% patients were having gradual onset of lower back pain and 90.75% patients were having seasonal change in condition of pain. All the patients (100%) revealed history of *Diwaswapna* (sleep during day time) [Chart 1].

Effect of *Agnikarma* (therapeutic heat burn) on subjective and objective criteria

It was observed that *Agnikarma* provided significant relief in *Katishoola* (pain in lower back) ($P < 0.001$), *Katistambha* (stiffness in lower back), *Akunchana Prasarana Pravrutti Savedana* (painful joint movements), forward flexion of lumbar joints, and extension of lumbar joint, VAS measurement for pain, straight leg raising test for both the legs, ODI Scale questionnaire and Schober's test for anterior flexion of lower back. Non significant effect ($P > 0.05$) was found in the lumbar joints [Table 1].

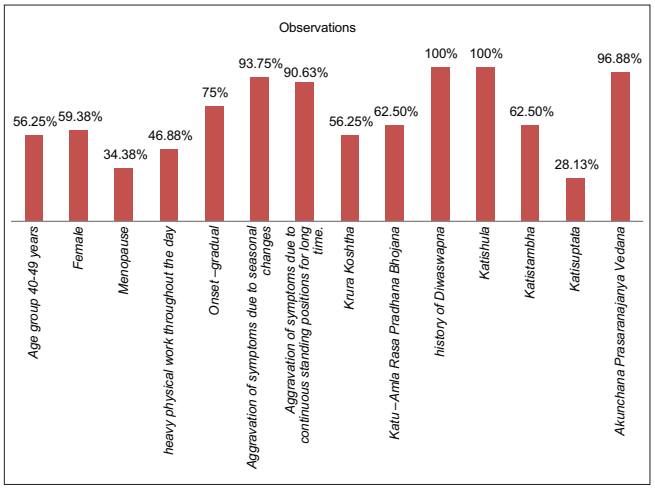

Chart 1: Observation on demographic data. ($n = 32$)

Table 1: Effect of *Agnikarma* (therapeutic heat burn) on subjective and objective parameters

Number	Subjective parameters	Mean score		Percentage of relief	*t*	*P*	Remarks
		BT	AT				
16	*Katishoola* (pain in lower back)	2.37	0.8	65.78	12.1	<0.001	HS
11	*Katistambha* (stiffness in lower back)	1.8	0.7	60	12	<0.001	HS
4	*Katisuptata* (numbness in lower back)	2.75	0.5	77.78	3.65	0.035	S
15	*Akunchana Prasarana Pravrutti Savedana* (painful joint movements)	2.2	1	54.54	8.29	<0.001	HS
	Objective parameters						
15	Flexion	1.9	0.6	68.96	10.5	<0.001	HS
2	Right lateral flexion	2	1	50	0	0.5	NS
14	Extension	1.42	0.42	70	9.5	<0.001	HS
16	VAS	2.3	1.3	44	11	<0.001	HS
16	SLR	2.6	1.2	54	7.7	<0.001	HS
16	Lasegue's sign	1	1	12.5	1.4	0.5	NS
15	ODI	1.31	0.43	71.1	14	<0.001	HS
16	Schober's test	2.3	1.1	53	8.7	<0.001	HS

BT: Before treatment, AT: After treatment, VAS: Visual Analog Scale, ODI: Oswestry Disability Index, HS: Highly significant, NS: Not significant, S: Significant, SLR: Straight Leg Raise

Effect of *Raktamokshana* (therapeutic bloodletting) on subjective and objective parameters

Raktamokshana was provided highly significant ($P < 0.001$) relief in *Katishoola* (pain in lower back), significant ($P < 0.005$) relief on *Katistambha* (stiffness in lower back), *Katisuptata* (numbness in lower back) and *Akunchana Prasarana Pravrutti Savedana* (painful joint movements). *Raktamokshana* was found highly significant ($P < 0.001$) in improving forward flexion of lumbar joint, VAS, straight leg raising, Lasegue's sign, ODI scale and Schober's test measurement. Significant effect of *Raktamokshana* was found in improving lumbar joint extension and non significant effect was found in the right and left lateral flexion of lumbar joint [Table 2].

Comparative effect of the therapies on subjective and objective parameters

Comparatively, *Agnikarma* was found having better effect than *Raktamokshana* in managing *Katishoola* (pain in lower back) (65.78%), *Katisuptata* (numbness in lower back) (77.78%), and *Akunchana Prasarana Pravritti Savedana* (painful movements) (54.54%). *Agnikarma* provided a better improvement in forward flexion of lumbar joint (68.96%), measurement of Schober's test (53%) and straight leg raise in both the legs (54.54%), whereas *Raktamokshana* provided comparatively better improvement in extension of lumbar joints (90%), VAS (50%), Lasegue's sign testing (55.55%) and ODI scale (75%). Similar improvement (50%) was found by the treatment modalities in lateral flexion of lumbar joints [chart 2 and chart 3]. No significant effect of therapy or difference was found on X-Ray (KL scale) in either of the groups.

Overall effect of therapy

In group A, 50% patients got moderate relief and 50% patients got marked improvement of lumbar spondylosis. In group B, 25% of patients got moderate relief and 75% of patients got marked relief in signs and symptoms of lumbar spondylosis. No patient remained unchanged after treatment nor only had complete remission in the symptoms [Chart 4].

Discussion

Total 34.38% females had attained menopause. Lack of estrogen in this period plays important role in calcium-binding capacity of bones. This condition can be correlated with *Dhatukshaya* (tissue degeneration) and *Vata Prakopa* (*Vata Dosha* provocation) which is one of a leading factor to cause *Kati Sandhigata Vata*.[13] 75% patients were reported with gradual onset of disease. These data suggests gradual progress of degenerative process. Mayuri Shah *et al.* reported the similar findings regarding gradual onset and progress of osteoarthritis.[14] A total of 93.75% of patients had a history of aggravation of low back pain due to seasonal changes. Atmospheric dryness and low temperature play synergistic role in establishing joint stiffness. As it is obvious that cold weather supports in increasing *Shita* (cold), *Ruksha* (dry) properties in body that helps in stiffening of joints. Also due to *Adana Kala* (destrengthening seasonal changes) it decreases *Sharirika*

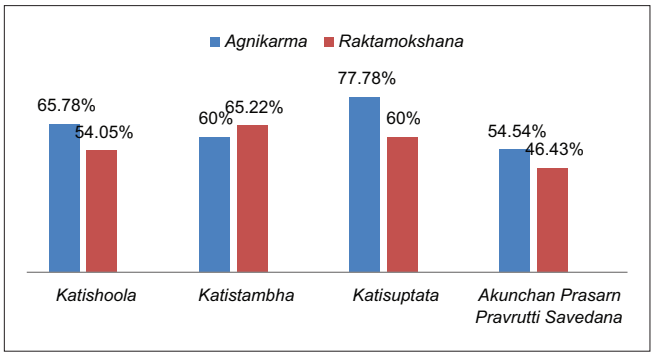

Chart 2: Comparative effect of the therapies in subjective criteria ($n = 32$)

Table 2: Effect of *Raktamokshana* on subjective and objective parameters

Number	Subjective parameters	Mean score		Percentage of relief	*t*	*P*	Remark
		BT	AT				
16	*Katishoola* (pain in lower back)	2.31	1.06	54.05	6.45	<0.001	HS
16	*Katistambha* (stiffness in lower back)	2.3	0.8	65.21	6.70	0.002	S
16	*Katisuptata* (numbness in lower back)	1.67	0.67			0.031	S
16	*Akunchana Prasarana Pravrutti Savedana* (painful joint movements)	1.75	0.93	46.42	4.33	0.002	S
	Objective parameters						
15	Flexion	1.73	0.67	61.53	9.25	<0.001	HS
2	Right lateral flexion	2	1	50		0.5	NS
2	left lateral flexion	1	0.5	50	-	0.5	NS
9	Extension	1.11	0.11	90	6	0.008	S
16	VAS	2	1	50	10.95	<0.001	HS
16	SLR	2.5	1.31	47.5	7.25	<0.001	HS
16	Lasegue's sign	0.56	0.25	55.55	2.07	<0.001	HS
16	ODI	1.25	0.31	75	6.53	<0.001	HS
16	Schober's test	2.25	1.18	47.22	5.50	<0.001	HS

BT: Before treatment, AT: After treatment, VAS: Visual Analog Scale, ODI: Oswestry Disability Index, HS: Highly significant, NS: Not significant, S: Significant, SLR: Straight Leg Raise

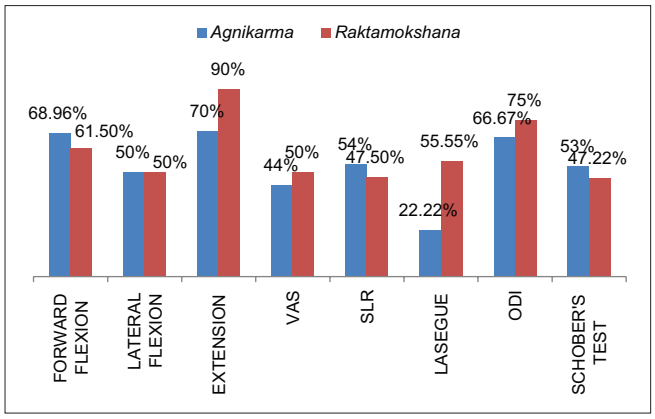

Chart 3: Comparative effect of the therapies on objective criteria ($n = 32$)

Figure 6: *Raktamokshana* (Therapeutic bloodletting) trolley

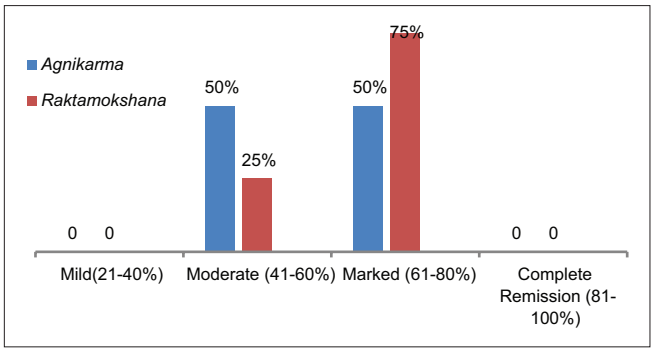

Chart 4: Overall effect of therapy ($n = 32$)

Figure 7: *Raktamokshana* (Therapeutic bloodletting) procedure

Bala (body strength) and patients are unable to tolerate pain due to lack of tissue strength.

It was observed that low back pain was aggravated due to prolonged standing (90.63% patients), prolonged walking (in 75% patients) and excessive weight lifting (in 65.63% patients). These factors may have induced compression over inter vertebral discs and nerve roots. Excessive and improper lumbar joint movements may have lead to provocation of *Vata Dosha* and *Dhatukshaya* (tissue degeneration) ultimately.

Total 62.5% of patients were taking *Katu – Amla Rasa* dominant (bitter and sour taste) food *Ruksha and Shita* (dry and cold) dominant food in their daily diet. These dietary habits may have interrupted with the digestion process and provoked *Vata Dosha*. According to literature, the inefficient metabolism converts fruit acids (sour tasted) partly into energy; the rest forms lactic acid. Acids liberate histamine which in turn causes swelling and strong inflammatory reaction.[15] All selected patients gave the history of *Diwaswapna* (non recommended daytime sleep). Daytime sleeping increases *Kapha* and *Meda* in the body. It is one of the prime causes for weight gain and impaired digestion, which is considered as a risk factor for *Kati Sandhigata Vata*.

Total 78.13% patients revealed the history of *Vega Sandharana* (suppression of natural urges) and 50% patients were reported with the history of *Shoka*. Kiecolt-Glaser JK *et al*. concluded that pro-inflammatory cytokine production can be stimulated by stress and depression in the absence of infection or injury. This may have aggravated the pathogenesis.[16]

Among the chief complaints, *Katishoola* (low backache) was found in all (100%) cases. In *Kati Sandhigata Vata*, the provoked *Vata Dosha* may have disturbed the function of *Katisandhi* (lumbar joint) and started the process of *Asthikshaya* (bony degeneration). Pain may have developed due to compression or irritation of the lumbo-sacral nerves.

Katistambha was found in 62.5% of patients. Due to predominance of *Shita* properties of *Vata* and *Kapha,* it may have produced the stiffness and the movement of lumbar joint may have been restricted.

Katisuptata was found in 28.13% of patients, which may have occurred due to *Shita* and *Ruksha* (cold and dry) properties of *Vata Dosha* and may have obstructed the *Vata.*

Akunchana Prasarana Pravritti Savedana (painful joint movements) was found in 96.88% patients.

Classical reference for occurrence of *Vatavyadhi* supports for *Dhatukshaya* (tissue degeneration) and

Margavarana Janya Samprapti (obstructive pathology) as a basic pathology. Proper functioning of lumbar joints can be possible with proper tissue nourishment and healthy tissue status. In *Dhatukshaya* (tissue degeneration), the tissues of lumbar joints (including *Asthi-Sandhi-Mamsa-Rakta-Rasa* and *Twaka*) degenerate. In *Margavarana Janya Samprapti* (pathway overlapping pathology), *Kapha Avritta Vyana Vayu* obstructs the normal blood circulation to lumbar joints. That may establish weaker tissues in compare to previous healthy tissues. Over functioning or improper excessive workload to lumbar joints makes it even weaker and vicious cycle starts that leads to *Kati Sandhigata Vata*.

Probable mode of action of *Agnikarma*

By applying *Ushna* (hot), *Sukshma* (penetrating), *Ashukari* (rapid acting) properties of *Agni* through *Agnikarma* to *Asthi Sandhi* (bony joints) by approaching *Twaka Dhatu* (skin), it produces direct impact on localized *Dhatvagni* (secondary level metabolism) and *Bhutagni* (tertiary level metabolism).

By hot nature, Agni is supposed to remove obstruction in *Dosha* pathways which may have occurred due to *Avarana* of *Vikrita Kapha* over *Vyana Vayu* and improves the circulation of *Rasa* and *Rakta* (blood circulation) to the localized pathology. By establishing proper nourishment to lumbar joints, it resumes proper lumbar joint function. In *Dhatukshaya* (tissue degeneration), it removes degenerated and nacrosis tissues aggregated in lumbar joints. Osteophytes of lumbar joint are psuedoprojections of bones due to irregular osteoclastic and osteoblastic activity. *Agnikarma* is supposed to weaken these structures (osteophytes) and provide relief in pain by reducing nerve compression. By elimination of accumulated tissue wastes, it may be removing extra calcium depositions of osteophytes, fibrous tissue in *Asthi Sandhi* (bony joints) through venous and lymphatic drainage. Establishment of *Agni* in particular *Sandhi* (joint) improves normal joint function and reduces further *Dhatukshaya* (degenerative changes). Thus it provides permanent relief from painful joints and reduces reccurrence of pain episodes.

Thus, established *Prakrita Dosha* (normal *Dosha*) in their natural *Ashraya* works in natural physiological way.[17]

Probable mode of action of *Raktamokshana*

Application of modified *Shringa Yantra* in *Dhatukshaya Janya Samprapti* (pathology of tissue degeneration) removes *Vata* vitiated blood from localized circulatory pathways (micro-vascular structures) and resumes adequate fresh blood flow that results in normal joint function and reduces the symptoms. By removing nutrition to osteophytes, extra bony growth, abnormal bony tissues, it recanalizes the nutritional pathway to the lumbar joints.

In *Marga-Avarana Janya Samprapti* (*Dosha* pathway overlapping pathology), *Raktamokshana* removes *Avarana* of *Kapha Dosha* over *Vyana Vayu* (overlapping of *Kapha Dosha* over *Vyana Vayu*) and establishes *Prakrita Rasa-Rakta Samvahana* (normal blood circulation) followed by proper nutrition to the joint.

The removed blood by modified *Shringa Yantra* possesses properties such as *Fenila* (frothy), *Aruna* (reddish), and *Krishna* (bluish black) which characteristically matches with the properties of vitiated blood mentioned by Acharya Sushruta.[18] Thus, modified *Shringa Yantra* can be correlated with ancient *Shringa Yantra* mentioned by Acharya Sushruta and characteristics of removed blood can be correlated with *Vata* vitiated *Rakta* (blood).

Conclusion

Agnikarma provided better relief in *Katishoola* (pain in lower back) and *Katisuptata* (numbness in lower back), whereas *Raktamokshana* provided better relief on *Katistambha* (stiffness in lower back).

No adverse reaction of therapy was found during and after the treatment in either of the groups. No changes were observed in plain film radiographs after the treatment. It was concluded that both the therapies have a definite role in relieving pain of lumbar spondylosis. However, *Agnikarma* is comparatively better management in treating *Kati Sandhigata Vata* (lumbar Spondylosis) than *Raktamokshana.*

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Conflicts of interest

There are no conflicts of interest.

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