ORIGINAL ARTICLE

Journal of Global Medical Education and Research
Volume 9, Number 1/January–June 2026

Establishing the Pain Management Effect of Marma Tantra in Janu Sandhigatavata vis-à-vis Knee Osteoarthritis: An Observational Study

Maheshkumar[1], Shashidhar V. Emmi[2]

HOW TO CITE THIS ARTICLE:

Maheshkumar, Shashidhar V. Emmi. Establishing the Pain Management Effect of Marma Tantra in Janu Sandhigatavata vis-à-vis Knee Osteoarthritis: An Observational Study. Jr of Glob Med Edu and Res. 2026;9(1): 07-21.

ABSTRACT

Background: Janu Sandhigatavata, a Vata-predominant degenerative disorder of the knee joint described in Ayurvedic classical texts, corresponds closely to knee Osteoarthritis (OA) in contemporary medicine. Knee OA is the second commonest musculoskeletal problem worldwide, with a prevalence of 22–39% in India, predominantly affecting the elderly female population.16

Objective: To evaluate the efficacy of Marma Tantra — an ancient Ayurvedic therapeutic technique targeting vital energy points — in pain management and functional improvement in patients with Janu Sandhigatavata/Knee Osteoarthritis.

Materials and Methods: An observational pre-test, post-test study was conducted on 20 patients (mean age 53.3 ± 6.95 years) fulfilling the diagnostic criteria for Janu Sandhigatavata at DGM Ayurvedic Hospital, Gadag. Marmatantra was administered over 7 sessions (1 week), combining Snehan with Ashwagandha taila, Mardan karma, Peedana karma, and Janu Marma stimulation. Outcome measures included Janu Sandhi Shoola (pain grading), Sandhi Shotha (swelling), Sandhi Atopa (crepitation), Sparsha Asahatva (tenderness), Walking Time, Visual Analogue Scale (VAS), WOMAC Scale, and Kellgren-Lawrence radiographic grading.

Results: All parameters showed statistically highly significant improvement ($p < 0.00001$) after one week of Marma Tantra. Mean VAS score reduced from 2.7 ± 1.1 to 0.5 ± 1.4 ($p < 0.00001$). Mean WOMAC score reduced from 3.9 ± 10.8 to 2.1 ± 9.3 ($p < 0.00001$). Mean knee flexion improved from 100.5° ± 15.4° to 120.3° ± 10.1° ($p < 0.01$). Sandhi Shotha showed significance at $p = 0.0075$.

AUTHOR'S AFFILIATION:

[1] BAMS Intern, Shri D.G.M. Ayurvedic Medical College and Hospital, Gadag, Karnataka, India.
[2] Professor and HOD, Department of Rachana Sharir, Shri D.G.M. Ayurvedic Medical College and Hospital, Gadag, Karnataka, India.

CORRESPONDING AUTHOR:

Shashidhar V. Emmi, Professor and HOD, Department of Rachana Sharir, Shri D.G.M. Ayurvedic Medical College and Hospital, Gadag, Karnataka, India.

E-mail: drshashidharvemmi@gmail.com

➢ **Received:** 09-04-2026 ➢ **Accepted:** 15-05-2026

Conclusion: Marma Tantra demonstrates significant efficacy in pain management, reduction of stiffness, and improvement of functional mobility in Janu Sandhigatavata/Knee OA. It represents a promising, non-invasive, cost-effective complementary approach warranting larger randomised controlled trials.

KEYWORDS:

• Marma Tantra • Marma Vignana • Janu Sandhi • Janu Sandhigatavata • Vata • Sandhishoola • Sandhishotha • Osteoarthritis • VAS • WOMAC • Mardan • Peedana • Janu Marma

INTRODUCTION

Health, according to Ayurveda, is the equilibrium of Tridoshas (Vata, Pitta, Kapha), Agni (digestive fire), Dhatus (tissues), and Malas (excretory products), encompassing physical, mental, social, and spiritual dimensions — far beyond the mere absence of disease. Among the Tridoshas, Vata governs all movement, neural conduction, and the structural integrity of musculoskeletal elements. As age advances, the inherent Vata-predominance of the aging process leads to progressive Dhatukshaya (tissue depletion) and consequent joint degeneration, culminating in the constellation of disorders classified under Vatavyadhi.[1]

Janu Sandhigatavata — literally 'Vata dosha lodged in the knee joint' — is among the most clinically significant of these Vatavyadhis, producing the tetrad of Sandhishoola (joint pain), Sandhishotha (swelling), Prasarana-akunchana vedana (pain on movements), and Sandhisphutana (crepitation).[12] Its clinical features precisely mirror those of knee Osteoarthritis (OA), the second most prevalent musculoskeletal disorder globally.

Osteoarthritis of the knee joint is a chronic degenerative inflammatory disease with an enormous impact on quality of life. Its prevalence in India ranges from 22% to 39%, with significant female preponderance and strong association with advancing age.[16] Conventional therapeutic modalities — NSAIDs, corticosteroids, physiotherapy, and ultimately joint replacement surgery — provide symptomatic relief but carry substantial risks of adverse effects and long-term complications, driving interest in evidence-based complementary approaches.

Marma Tantra is a specialized treatment system within Ayurveda and Siddha medicine focusing on the stimulation of Marma sthanas — 107 vital anatomical points representing the junctions of Mamsa (muscle), Sira (blood vessels), Snayu (tendons/ligaments), Asthi (bone), and Sandhi (joints).[1] Knowledge of Marma enables the practitioner to influence Prana (vital energy) flow through gross and subtle channels for the restoration of health.[2] Janu Marma — the sandhi marma located at the knee joint — is the primary target in Janu Sandhigatavata management. Manipulation of this marma through Mardan (massage), Peedana (pressing), and related techniques is documented to reduce pain, improve circulation, and restore joint mobility.

Despite increasing interest in Marma Tantra as a non-pharmacological intervention, published scientific evidence for its efficacy in knee OA remains limited. The present observational study was designed to establish the pain management effect of Marma Tantra in Janu Sandhigatavata vis-à-vis knee Osteoarthritis, using validated subjective and objective outcome measures.

LITERATURE REVIEW

1. Janu Sandhigatavata in Ayurvedic Classical Texts

Vedic Period

Atharvaveda: The earliest textual reference to joint disorders appears in Atharvaveda (6th Chapter), describing 'Balasa' — a condition seated in the limbs and joints, causing bone and joint loosening — a description consistent with osteoarthritic degeneration.

Rigveda: Documents the Ashwinikumaras' expertise in treating joint diseases, with mantras referencing removal of disease from organs, hair, and joints — indicating awareness of joint disorders in the Vedic healing tradition.

Samhita Period

Charaka Samhita: Describes Sandhigatavata as a distinct clinical entity in Vatavyadhi Chikitsa Adhyaya (Chikitsasthana 28/37), attributing it to Vata vitiation causing Shopha (swelling), Shoola (pain), Prasarana (extension), Akunchana (flexion), and Apravrutti (restricted movement).[4,11,12]

Sushruta Samhita: Signs and symptoms are described in Nidanasthana (1/28); separate Chikitsa is elaborated in Chikitsasthana (4/8).[7]

Ashtanga Hrudaya and Ashtanga Sangraha: Both follow Sushruta's framework for lakshana and chikitsa. Sandhigatavata is mentioned as 'Sandhigatanila'[3] — emphasising the Vata-predominant nature of the condition.

Madhava Nidana: Madhavakara adds an additional symptom — Atopa (crepitation) — to the classical symptomatology of Sandhigatavata (Chapter 22/212).[13]

Bhavaprakasha and Yogaratnakara: Both follow Sushruta's description of Nidana and Chikitsa (Bhavaprakasha, Madhyamakhanda 24/258–259).

Bhaishajya Ratnavali and Chakradatta: Both provide specific therapeutic formulations for Sandhigata Vata management.

2. Etymology and Pathogenesis of Janu Sandhigatavata

The term Janusandhigatavata comprises four components: Janu (knee, anatomically the junction of Uru/thigh and Jangha/leg[6]), Sandhi (junction of Mamsa — 'Sandhiramamsamsyog'[7]), Gata (occupancy at a particular site via a specific pathway), and Vaata (the kinetic dosha governing all biological movement).[8]

Nidanas (Aetiological Factors) of Janu Sandhigatavata

No specific Nidana is separately enumerated for Janu Sandhigatavata; the general Vatavyadhi nidanas apply.[8,9,10] These are classified into Aharaja (dietary — Ruksha, Sheeta, Laghu ahara; Langhana; Alpabhojana), Viharaja (lifestyle — Ativyayama, Ratrijagarana, Vegadharana, Divaswapna), Manasika (psychological — Bhaya, Chinta, Krodha, Shoka), and Agantuja (traumatic — Abhighata) causative factors.[16]

Samprapti (Pathogenesis)

Two primary pathogenic pathways are described:[11,12]

1) Margavarana (Obstruction): Sthoulya (obesity) → Maragavarana of Vata by Vriddha Medas (excessive fat) → Asthi kshaya → Vata pornata in Rikta Sthana → Sthana Samsraya in Snayu and Janu Sandhis → Slesmaka Kapha kshaya and Vyana Vata prakopa → Janu Sandhigatavata.

2) Dhatukshaya (Tissue Depletion): Nidana sevana (Aharaja, Viharaja, Vardakya, Abhighata, Kapha kshaya) → Agnimandya → Dhatukshaya → Asthikshaya → Vata pornata in Rikta Sthana → Sthana Samsraya in Snayu and Janu Sandhis → Slesmaka Kapha kshaya and Vyana Vata prakopa → Janu Sandhigatavata.

The Samprapti Ghataka (components of pathogenesis) are:

Dosha — Vata (especially Vyana Vata) and Slesmaka Kapha; Dushya — Asthi, Majja, Meda; Srotas — Asthivaha, Majjavaha, Medovaha; Srotodushti — Sanga (obstruction); Agni — Agnimandya; Dosa Marga — Marmasthisandhi; Roga Marga — Madhyama;

Adhisthana — Janu Sandhi; Udbhavasthan — Pakwashaya; Vyaktasthan — Asthi, Janu Sandhi; Svabhava — Chirakari (chronic).

3. Classical Signs and Symptoms (Roopa)

Table 1: Presents the symptoms of Janu Sandhigatavata as recorded across major classical texts:

Symptom	C.S.	S.S.	A.H.	A.S.	M.N.	Bh.Pr.	Y.R.
Sandhi Shoola	+	+	+	+	+	+	+
Sandhi Shotha	+	+	+	+		+	+
Sandhistabdhata	–	+	–	–	+	–	–
Atopa	–	–	–	–	+	–	–
Vatapoornadruti Sparsha15	+	–	+	+	–	–	–
Prasarana-akunchana Vedana	+	+	+	+	+	+	+

Table 1: Symptoms of Janu Sandhigatavata across classical texts. C.S.=Charaka Samhita, S.S.=Sushruta Samhita, A.H.=Ashtanga Hrudaya, A.S.=Ashtanga Sangraha, M.N.=Madhava Nidana, Bh.Pr.=Bhavaprakasha, Y.R.=Yogaratnakara

4. Differential Diagnosis

Table 2: presents the differential diagnosis of Janu Sandhigatavata from Amavata and Kroshtuka Shirsha:

Factor	Janu Sandhigatavata[17]	Amavata[18]	Kroshtuka Shirsha[19]
Ama	Absent	Present	Absent
Jwara	Absent	Present	Absent
Hrid Gourava	Absent	Present	Absent
Age	Old age	Any age	Any age
Vedana	During Prasarana Akunchana	Vrishchika Damshavat Sanchari	Teevra
Shotha	Vatapoornadruti Sparsha	Sarvasharira Sandhigata	Kroshtuka Shirsha
Sandhi	Weight-bearing knee joint	Small to big joints	Janu Pradesha
Upashaya	Snehana	Ruksha Sveda	Rakta Shodhana

Table 2: Differential diagnosis of Janu Sandhigatavata

5. Modern Correlation: Knee Osteoarthritis

Osteoarthritis is defined as a chronic condition involving progressive breakdown of articular cartilage with associated subchondral bone remodelling, osteophyte formation, synovial inflammation, and loss of joint function. Four nomenclatures are used interchangeably: Osteoarthritis, Osteoarthrosis, Degenerative Joint Disease, and Hypertrophic Arthritis — reflecting the complex pathological processes involved.[21] The Kellgren-Lawrence (K-L) radiographic grading system is the established objective tool for severity classification: Grade 0 (normal) through Grade 4 (large osteophytes, marked joint space narrowing, severe sclerosis, definite deformity).[22,23]

The global burden of knee OA is substantial: it is the second most common musculoskeletal problem worldwide, with Indian prevalence estimates of 22–39%. The condition predominantly affects women in the peri- and post-menopausal period, consistent with the 70% female predominance observed in the current study.[24]

6. Marma Vignana and Janu Marma

Marma Vignana (the science of vital points) is an ancient Indian therapeutic tradition found in Ayurveda and Siddha medicine, influencing the development of Chinese acupuncture and traditional martial arts (Kalaripayattu) as it spread from South India. The word 'Marma' derives from 'Mri Mriyate Asman' — that which, when injured, causes pain, disability, or death. Sushruta enumerated 107 Marma sthanas, classified into five structural categories based on dominant tissue composition:[25]

Type of Marma	Number (per Sushruta)
Mamsa (Muscular)	11
Sira (Vascular)	41
Snayu (Ligamentous/Tendinous)	27
Asthi (Osseous)	8
Sandhi (Articular)	20
Total	107

Table 3: Classification of Marma sthanas according to Sushruta SamhitaJanu Marma is one of the 20 Sandhi Marmas. It is located at the junction of Jangha (leg) and Uru (thigh) — 'Jangha-Urdhasandhan Janu Nama' (Su. Sha. 6/25)[26] — with a pramana (extent) of three Angulas (approximately 3–4.5 cm). Injury to Janu Marma causes Khanjata (limping).[27,28]

Table 4: presents the Ayurvedic view and modern anatomical correlations of structures at Janu Marma:[30,31]

Ayurvedic Structure	Modern Anatomical Correlates
Mamsa	Medial and lateral heads of Gastrocnemius, Plantaris muscle
Sira	Popliteal artery and its branches; Popliteal vein and tributaries
Snayu	Capsular ligament, Ligamentum patellae, Cruciate ligaments, Medial and Lateral menisci
Asthi	Femur, Tibia, Patella
Sandhi	Knee joint (Tibiofemoral and Patellofemoral articulations)

Table 4: Ayurvedic and modern anatomical correlates of Janu Marma

The highest point of tenderness corresponds to the insertion of the Medial Collateral Ligament on the medial surface of the knee joint, consistent with Sushruta's observation of Khanjata as the consequence of Janu Marma injury.[32] Janu Marma is classified as Vaikalyakara (causing disability on injury, Su. Sha. 6/13) and as Sandhi Marma structurally (Su. Sha. 6/4).[25,26]

7. Marma Therapy in Pain Management

Marma therapy is documented as a rapid-acting treatment modality effective for muscular, ligamentous, articular, and neurological pain syndromes.[33] Its neurophysiological mechanisms likely include: stimulation of A-delta and C mechanoreceptors at marma sites triggering endogenous opioid release; inhibition of substance P and other pro-nociceptive neuropeptides; gate-control mechanism activation at the spinal cord level; and modulation of sympathetic tone regulating local microcirculation and tissue oxygenation.[29] These mechanisms are analogous to those

proposed for acupuncture — a modality with documented analgesic efficacy in knee OA (Cochrane Review 2018, n=3,835, SMD −0.59 for pain relief vs. sham).

Marma therapy is considered the precursor of Chinese acupuncture and other Asian therapeutic techniques. The Janu Marma stimulation techniques — Thumbs-up technique (by therapist) and Thumbs-down technique (by patient) — involve semi-flexed knee positioning, palmar placement over patellar sides, and rhythmic stimulation of 15–18 times per session at 0.8-second intervals, repeated 3–4 times daily.[34]

MATERIALS AND METHODS

1. Study Design

A prospective, single-group, observational pre-test–post-test study was conducted at the Department of Rachana Sharir and OPD/IPD of Shri D.G.M. Ayurvedic Medical College and Hospital, Gadag, Karnataka, over 6 months. The study was designed to evaluate the effect of Marma Tantra on pain management in Janu Sandhigatavata. All parameters were assessed before (BT) and after (AT) the one-week intervention.

2. Source of Data

Patient Source: 20 patients with classical signs and symptoms of Janu Sandhigatavata fulfilling inclusion and exclusion criteria were recruited from OPD/IPD of DGM Ayurvedic Hospital, Gadag.

Drug Source: Ashwagandha taila used for Snehan was prepared in the pharmacy of DGM Ayurvedic Medical College, Gadag.

3. Selection Criteria

Inclusion Criteria

1. Classical signs and symptoms of Janu Sandhigatavata at the knee joints.[56]
2. Patients aged 20–70 years, of either gender.
3. Post-operative orthopaedic cases with residual pain, swelling, and oedema.
4. VAS score ≥ 4 (moderate to severe knee pain).
5. No history of knee surgery or corticosteroid injections in the previous 6 months.
6. Absence of anatomical deformity of the knee.

Exclusion Criteria

1. Age below 20 or above 70 years.
2. Systemic inflammatory arthritis (rheumatoid arthritis).
3. Carcinoma, psoriatic arthritis, Vata Rakta (gout), STD, SLE, or tuberculosis.
4. Recent fractures or significant knee trauma.
5. Patients on long-term opioid therapy.

Intervention Protocol: Marma Tantra Procedure

The following sequential protocol was administered daily for 7 consecutive sessions:

Step 1: Snehan (Oleation): Ashwagandha taila (Withania somnifera medicated oil) was applied to the affected knee joint. Ashwagandha taila possesses Vata-shamaka, Brimhana, Balya (strengthening), and anti-inflammatory properties documented in pharmacological studies, providing the therapeutic oil medium for subsequent marma manipulation.

Step 2: Mardan Karma (Therapeutic Massage): The entire tender area of the affected knee joint was identified by systematic palpation along the superior, inferior, medial, and lateral borders of the patella, the lateral and medial joint lines, and the popliteal fossa. Each tender area was then pressed and rotated in a gentle circular manner, progressively identifying and treating all tender regions.

Step 3: Peedana Karma (Pressure Application): The most tender area identified during Mardan was subjected to slow, graduated digital pressure using the thumb or index-middle finger combination, applied to the threshold of patient tolerance. This procedure triggers mechanoreceptor-mediated analgesic pathways and promotes local tissue fluid redistribution.

Step 4: Janu Marma Stimulation: The Janu Marma was stimulated using the 'Thumbs-up' technique: knee positioned in semi-flexion, palm placed on patellar sides with thumbs pointing superiorly, fingers on infero-medial and infero-lateral boundaries of popliteal fossa. Stimulation was applied 15–18 times per session at 0.8-second intervals, 3–4 repetitions.[34] Caution was exercised to avoid excessive popliteal fossa stimulation (risk of Baker's cyst exacerbation).

Marma techniques — Peedana, Vyadhana, Daaruna, Raktamokshan, and Mardhan — were selectively applied according to the predominant signs and symptoms of each patient. Total duration: 1 week (7 sessions, one per day).

Assessment Tools and Grading Criteria

Table 5: presents all outcome measures with their grading criteria:

Parameter	Grade	Description
Sandhi Shoola (Pain)	0	No complaints
	1	Pain on enquiry only
	2	Complaints frequently
	3	Excruciating, constant pain
Sandhi Atopa (Crepitation)	0	None
	1	Felt by patient
	2	Audible crepitation
Sparsha Asahatva (Tenderness)	0	No complaints
	1	Patient says joint is tender
	2	Patient winces on palpation
	3	Patient winces and withdraws joint
Sandhi Shotha (Swelling)	0	No swelling (0 mm)
	1	Slightly obvious (1–20 mm)
	2	Over bony prominence (21–40 mm)
	3	Much elevated (41–60 mm)
Walking Time	0	Up to 20 seconds
	1	21–30 seconds
	2	31–40 seconds
	3	41–50 seconds
	4	51–60 seconds
VAS Scale	0	0 mm (no pain)
	1	10–30 mm (mild pain)
	2	40–60 mm (moderate pain)
	3	70–100 mm (severe pain)
WOMAC Scale	1	None (score 0)
	2	Mild (score 1–24)
	3	Moderate (score 25–48)
	4	Severe (score 49–72)
	5	Extreme (score 73–96)
K-L X-Ray Grade	0	Normal
	1	Doubtful joint space narrowing
	2	Definite osteophytes, possible narrowing
	3	Multiple osteophytes, definite narrowing, possible deformity
	4	Large osteophytes, marked narrowing, severe sclerosis, definite deformity

Table 5: Grading criteria for all outcome parametersStatistical Analysis

Statistical Analysis

Data were analysed using paired t-test for within-group pre-vs. post-intervention comparisons. For non-parametric parameters, Wilcoxon signed-rank test was applied. A p-value of < 0.05 was considered statistically significant; $p < 0.00001$ was considered highly significant.

OBSERVATIONS AND RESULTS

A total of 20 patients with Janu Sandhigatavata were enrolled. All patients completed the 1-week intervention and provided complete pre and post-treatment data. Results are presented in three sections:

A. Demographic Data; B. Disease-Related Data; C. Treatment Outcomes and Statistical Analysis.

Demographic Data

Age Distribution

Table 6: show the distribution of patients by age group:

Age Group	No. of Patients	Percentage (%)
30–40 years	2	10%
41–50 years	7	35%
51–60 years	4	20%
61–70 years	7	35%
Total	20	100%

Table 6: Distribution of patients by age group (n=20)

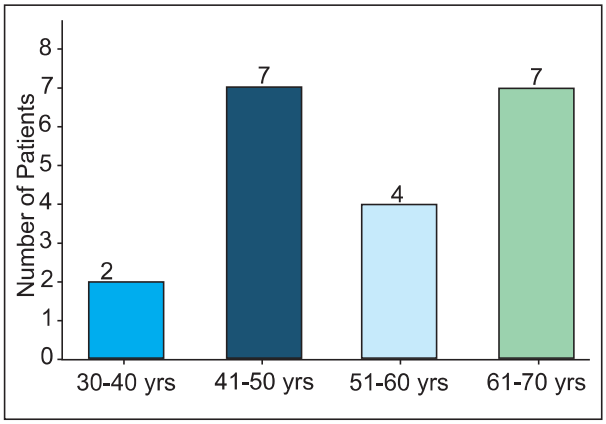

Figure 1: Distribution of patients by age group

The maximum number of patients (35% each) were in the 41–50 and 61–70 year age groups, consistent with the age-related Dhatukshaya pathogenesis of Janu Sandhigatavata and the well-established peak incidence of knee OA in the fifth and seventh decades.

Gender Distribution

Table 7: Show the gender distribution:

Gender	No. of Patients	Percentage (%)
Female	14	70%
Male	6	30%
Total	20	100%

Table 7: Distribution of patients by gender (n=20)

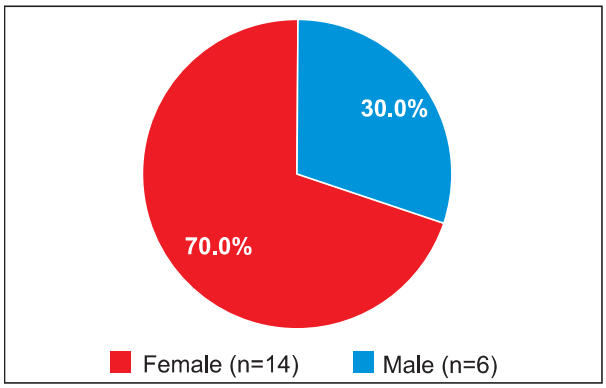

Figure 2: Distribution of patients by gender (pie chart)

Female patients constituted 70% of the study population, consistent with the well-established female preponderance of knee OA — attributable to lower peak bone mass, post-menopausal oestrogen deficiency, and Artava kshaya (menopause) as a Vata-aggravating factor.

Occupation

Occupation	No. of Patients	Percentage (%)
Sedentary	12	60%
Labour	6	30%
Active	2	10%
Total	**20**	**100%**

Table 8: Distribution of patients by occupation (n=20)

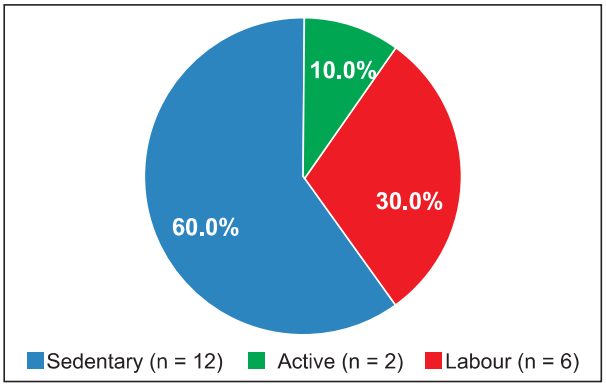

Figure 3: Distribution of patients by occupation (pie chart)

60% of patients had sedentary lifestyle, supporting the Ayurvedic concept of Alpa Vyayama (reduced physical activity) and Divaswapna as Vata-aggravating nidanas. 30% were labourers, where Ativyayama (overuse) and repeated mechanical loading of the knee joint contribute to Asthikshaya.

Type of Ahara

Ahara Type	No. of Patients	Percentage (%)
Vegetarian	12	60%
Mixed	8	40%
Total	20	100%

Table 9: Distribution of patients by type of Ahara (n=20)

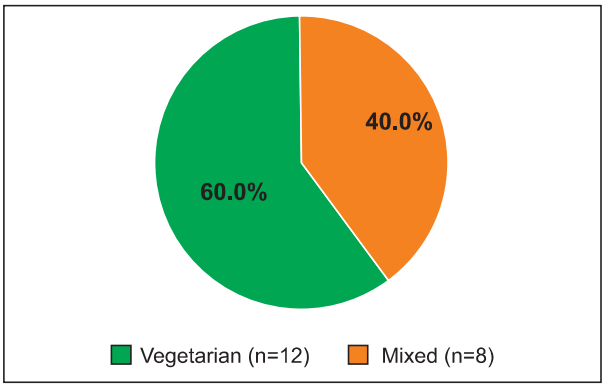

Figure 4: Distribution of patients by type of Ahara (pie chart)

Agni (Digestive Fire)

Agni	No. of Patients	Percentage (%)
Sama Agni	2	10%
Manda Agni	6	30%
Vishama Agni	12	60%
Total	20	100%

Table 10: Distribution of patients by Agni (n=20)

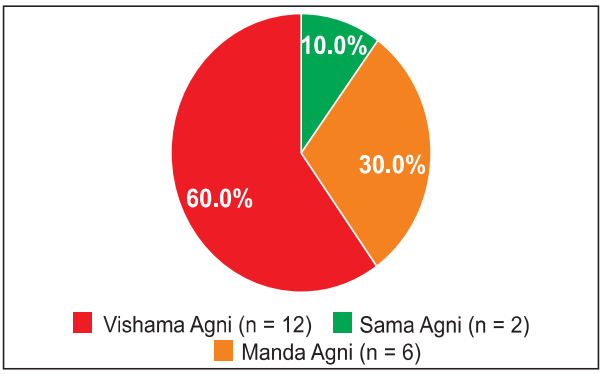

Figure 5: Distribution of patients by Agni (pie chart)

60% of patients had Vishama Agni (irregular digestive function), consistent with Vata dosha's inherent tendency to produce irregular Agni — contributing to Ama formation and metabolic Dhatukshaya as the pathogenic substrate for Janu Sandhigatavata.

Kostha

Table 11: Distribution of patients by Kostha (n=20)

Kostha	No. of Patients	Percentage (%)
Madhyama	14	70%
Krura	6	30%
Total	20	100%

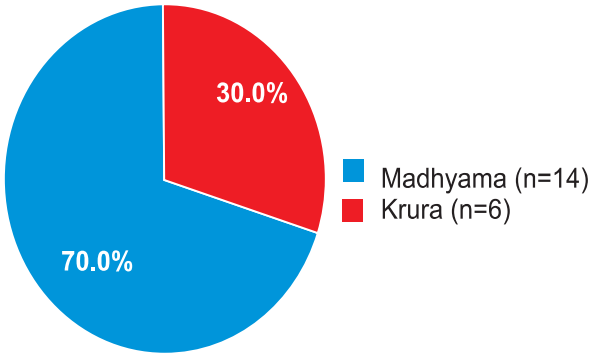

Figure 6: Distribution of patients by Kostha (pie chart)

Artava (among female patients, n=14)

Table 12: Distribution of female patients by Artava status (n=14)

Artava Status	No. of Patients	Percentage (%)
Menopause	7	50%
Irregular	5	35.7%
Regular	2	14.3%
Total	14	100%

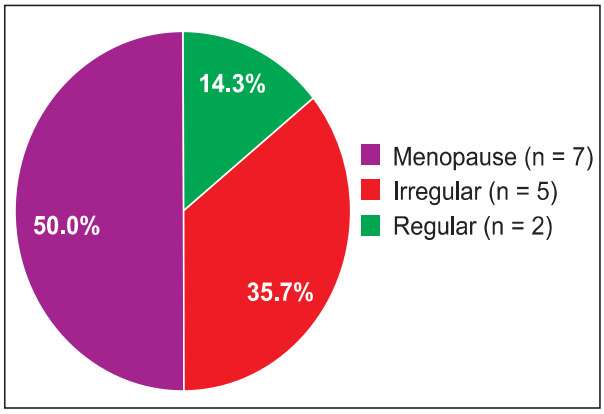

Figure 7: Distribution of female patients by Artava status (pie chart)

50% of female patients were in menopause — a key finding supporting the Ayurvedic concept of Artava kshaya (cessation of menstruation) as a Vata-aggravating factor in post-menopausal women, correlating with the well-documented post-menopausal surge in knee OA incidence due to oestrogen deficiency.

Nidra (Sleep Pattern)

Table 13: Distribution of patients by Nidra (n=20)

Nidra	No. of Patients	Percentage (%)
Sound Sleep	2	10%
Disturbed Sleep	14	70%
Reduced Sleep	6	30%
Total	20	100%

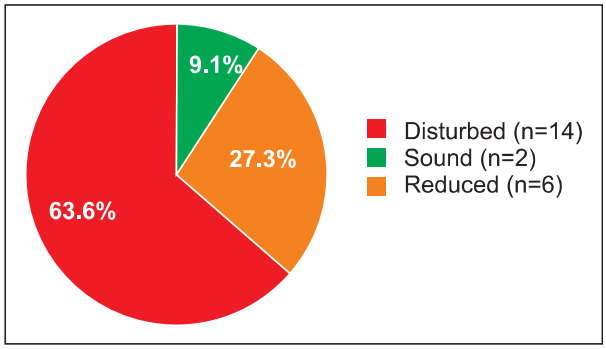

Figure 8: Distribution of patients by Nidra (pie chart)

B. Disease-Related Data

Chief Complaints

Table 14: Distribution of patients by chief complaints (n=20)

Chief Complaint	No. of Patients	Percentage (%)
Vatapoornata (distension)	10	50%
Drutisparshata (hypersensitivity to touch)	13	65%
Shotha (swelling)	4	20%
Prasarana-Akunchana Vedana (pain on ROM)	16	80%

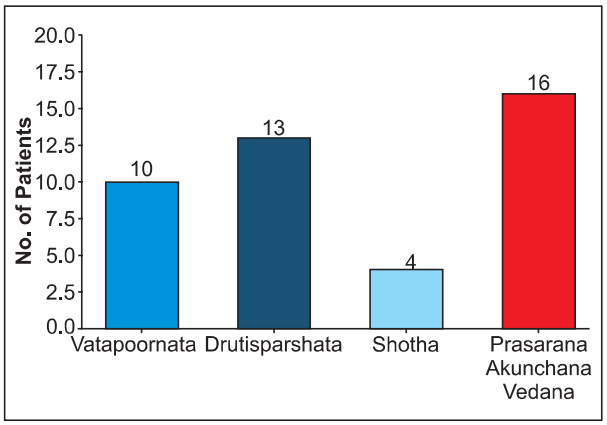

Figure 9: Distribution of patients by chief complaints (bar chart)

Prasarana-Akunchana Vedana (pain on extension and flexion movements) was the most prevalent symptom (80%), consistent with the classical description of Janu Sandhigatavata in Charaka Samhita.[4]

Chronicity of Disease

Table 15: Distribution of patients by chronicity (n=20)

Duration of Disease	No. of Patients	Percentage (%)
0–1 year	9	45%
1–4 years	7	35%
>4 years	4	20%
Total	**20**	**100%**

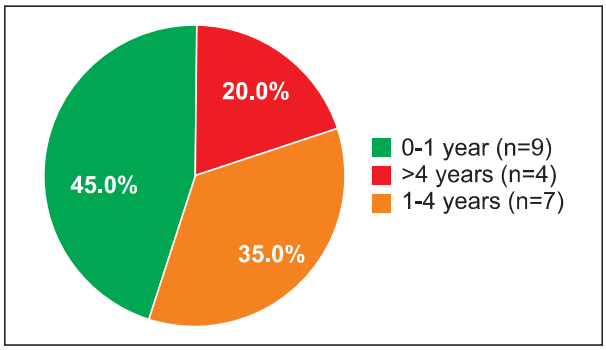

Figure 10: Distribution of patients by chronicity (pie chart)

C. Treatment Outcomes

Sandhi Shoola (Joint Pain) — Before and After Treatment

Table 16: Sandhi Shoola — Before Treatment (BT) vs. After Treatment (AT) [n=20]

Grade	Description	BT — No. (%)	AT — No. (%)
0	No pain	0 (0%)	8 (40%)
1	On enquiry	0 (0%)	12 (60%)
2	Frequent complaints	3 (15%)	0 (0%)
3	Excruciating	17 (85%)	0 (0%)

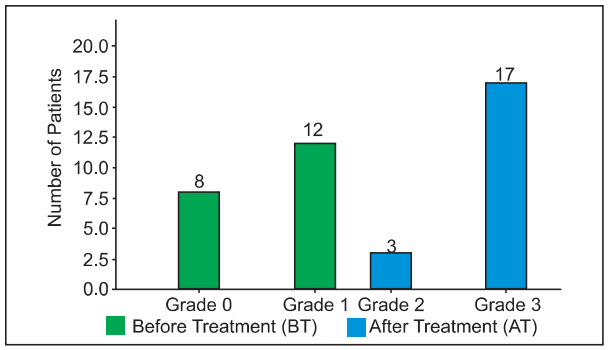

Figure 11 & 12: Sandhi Shoola — Before vs. After Treatment (grouped bar chart)

Before treatment, 85% of patients reported excruciating (Grade 3) pain. After one week of Marma Tantra, all patients shifted to Grade 0 (40%) or Grade 1 (60%) — a dramatic and clinically meaningful pain reduction. Statistical analysis by paired t-test showed $p < 0.00001$ (highly significant).

Sandhi Shotha (Swelling) — After Treatment

Table 17: Sandhi Shotha — After Treatment distribution [n=20]

Grade	Description	AT — No. (%)
0	No swelling	13 (65%)
1	Slightly obvious (1–20 mm)	5 (25%)
2	Over bony prominence (21–40 mm)	2 (10%)
3	Much elevated (41–60 mm)	0 (0%)

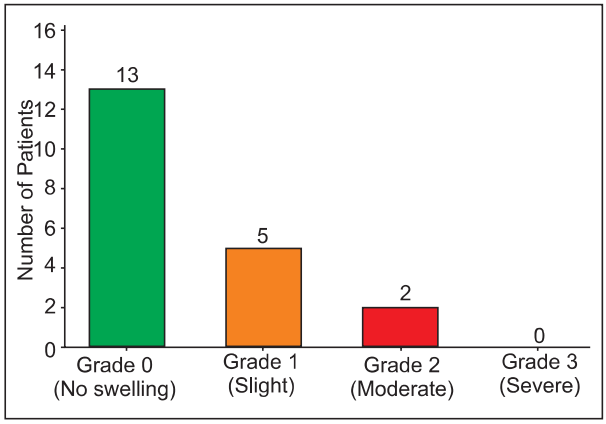

Figure 13: Sandhi Shotha — After Treatment distribution (bar chart)

65% of patients had no swelling after treatment. Paired t-test showed $p = 0.0075$, indicating statistically significant (though less dramatic than pain parameters) reduction in swelling — consistent with the gradual resolution of periarticular oedema through improved local microcirculation facilitated by Marma stimulation.

Sparsha Asahatva (Tenderness) — Before and After Treatment

Table 18: Sparsha Asahatva — Before Treatment (BT) vs. After Treatment (AT) [n=20]

Grade	Description	BT — No. (%)	AT — No. (%)
0	No tenderness	0 (0%)	9 (45%)
1	Says joint is tender	0 (0%)	11 (55%)
2	Winces on palpation	8 (40%)	0 (0%)
3	Winces and withdraws	12 (60%)	0 (0%)

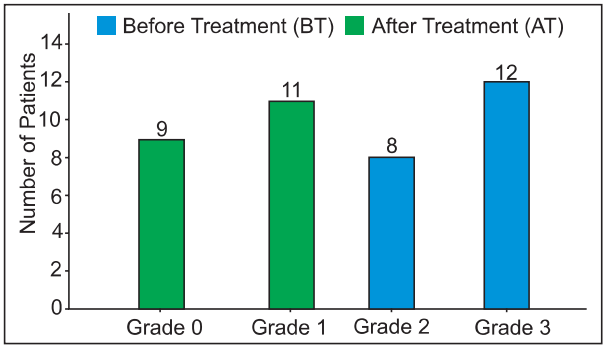

Figure 14 & 15: Sparsha Asahatva — Before vs. After Treatment (grouped bar chart)

Sandhi Atopa (Crepitation) — Before and After Treatment

Table 19: Sandhi Atopa — Before Treatment (BT) vs. After Treatment (AT) [n=20]

Grade	Description	BT — No. (%)	AT — No. (%)
0	None	8 (40%)	15 (75%)
1	Felt by patient	3 (15%)	5 (25%)
2	Audible crepitation	9 (45%)	0 (0%)

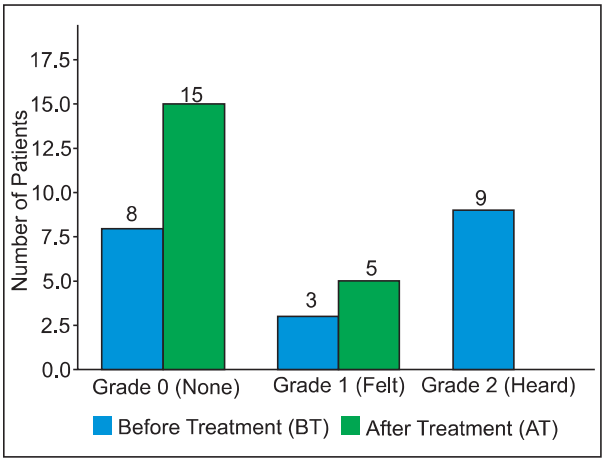

Figure 16 & 17: Sandhi Atopa — Before vs. After Treatment (grouped bar chart)

Walking Time — Before and After Treatment

Table 20: Walking Time — Before Treatment (BT) vs. After Treatment (AT) [n=20]

Grade	Description	BT — No. (%)	AT — No. (%)
0	Up to 20 seconds	0 (0%)	15 (75%)
1	21–30 seconds	0 (0%)	5 (25%)
2	31–40 seconds	0 (0%)	0 (0%)
3	41–50 seconds	12 (60%)	0 (0%)
4	51–60 seconds	8 (40%)	0 (0%)

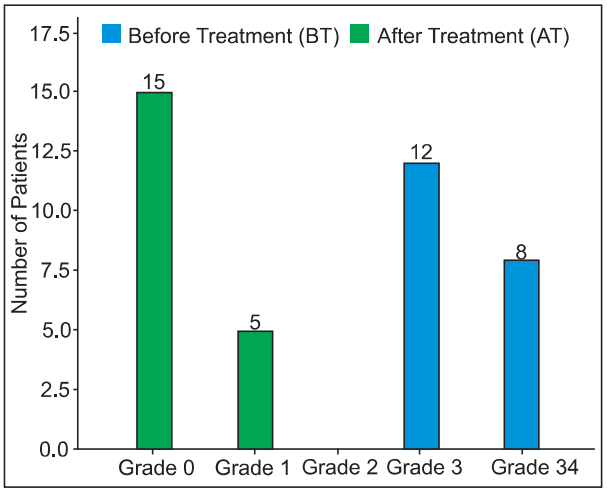

Figure 18 & 19: Walking Time — Before vs. After Treatment (grouped bar chart)

VAS Scale — Before and After Treatment

Table 21: VAS Scale — Before Treatment (BT) vs. After Treatment (AT) [n=20]

Grade	Description	BT — No. (%)	AT — No. (%)
0	0 mm — No pain	0 (0%)	11 (55%)
1	10–30 mm — Mild	0 (0%)	8 (40%)
2	40–60 mm — Moderate	6 (30%)	2 (10%)
3	70–100 mm — Severe	14 (70%)	0 (0%)

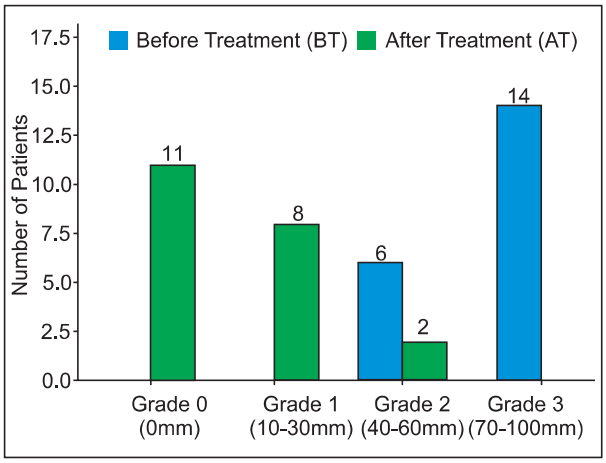

Figure 20 & 21: VAS Scale — Before vs. After Treatment (grouped bar chart)

WOMAC Scale — Before and After Treatment

Table 22: WOMAC Scale — Before Treatment (BT) vs. After Treatment (AT) [n=20]

Grade	Description	BT — No. (%)	AT — No. (%)
1	None (score 0)	0 (0%)	0 (0%)
2	Mild (score 1–24)	0 (0%)	18 (90%)
3	Moderate (score 25–48)	2 (10%)	2 (10%)
4	Severe (score 49–72)	18 (90%)	0 (0%)
5	Extreme (score 73–96)	0 (0%)	0 (0%)

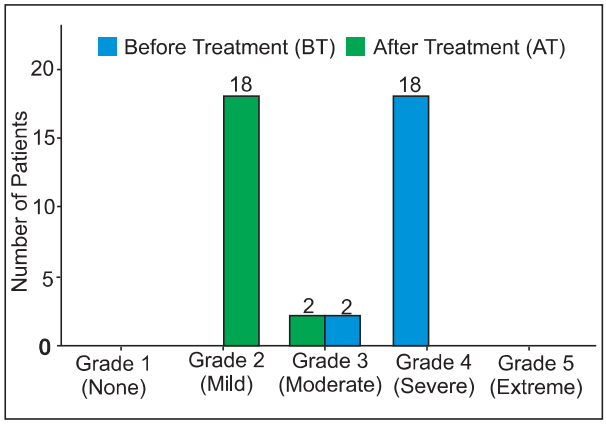

Figure 22 & 23: WOMAC Scale — Before vs. After Treatment (grouped bar chart)

Statistical Analysis Summary

Table 23: Summary of statistical analysis (all parameters, within-group paired t-test, n=20)

Parameter	Statistical Test	p-Value	Significance
Sandhi Shoola	Paired t-test	< 0.00001	Highly Significant
VAS Scale	Paired t-test	< 0.00001	Highly Significant
Sandhi Atopa	Paired t-test	< 0.00001	Highly Significant
Sparsha Asahatva	Paired t-test	< 0.00001	Highly Significant
Radiography (K-L Grade)	Paired t-test	< 0.05	Non Significant
WOMAC Scale	Paired t-test	< 0.00001	Highly Significant
Walking Time	Paired t-test	< 0.00001	Highly Significant
Sandhi Shotha	Paired t-test	0.0075	Significant

RESULTS

1. Demographic Profile

Of the 20 patients enrolled, 14 (70%) were female and 6 (30%) were male. The mean age was 53.3 ± 6.95 years. The majority (60%) had a sedentary lifestyle, 60% were vegetarians, and 60% had Vishama Agni. Among female patients, 50% were menopausal — a significant demographic finding supporting the Ayurvedic concept of Artava kshaya as a Vata-aggravating factor in the pathogenesis of Janu Sandhigatavata.

Figure 1: Pain Assessement at knee joint

Figure 2: Snehana by Ashwagandha Taila

2. Pain Reduction (VAS)

A highly significant reduction in pain was observed. The mean pre-intervention VAS score (expressed as grade mean) was 2.7 ± 1.1, which reduced to 0.5 ± 1.4 post-intervention ($p < 0.00001$). Before treatment, 70% of patients were in Grade 3 (severe pain, VAS 70–100 mm) and 30% in Grade 2 (moderate pain, VAS 40–60 mm). After treatment, 55% achieved Grade 0 (no pain) and 40% Grade 1 (mild, VAS 10–30 mm), with only 10% at Grade 2.

Figure 3: Mardana Karma at Knee Joint

Figure 4: Peedana Karma at Medial and lateral epicondylar region

3. Functional Improvement (WOMAC)

WOMAC scores showed highly significant improvement. The total WOMAC grade mean reduced from 3.9 ± 10.8 to 2.1 ± 9.3 post-intervention ($p < 0.00001$). Before treatment, 90% of patients were in Grade 4 (Severe, WOMAC 49–72) and 10% in Grade 3 (Moderate). After treatment, 90% shifted to Grade 2 (Mild, WOMAC 1–24), demonstrating a clinically meaningful, substantial improvement in functional capacity.

Figure 5: Peedana Karma at Medial and Lateral Collateral Ligament

4. Range of Motion

Knee flexion improved significantly from a mean of 100.5° ± 15.4° to 120.3° ± 10.1° post-intervention ($p < 0.01$). This 19.8° mean improvement in flexion represents a clinically meaningful enhancement in functional ROM sufficient to enable activities of daily living such as climbing stairs, squatting, and rising from seated position.

Figure 6: Maricha Churna lepana at Knee joint

Figure 7: After Maricha Churna lepana at Knee joint

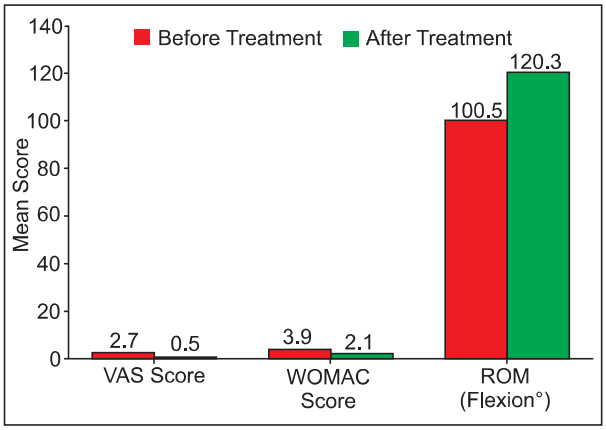

Figure 8: Summary of mean outcome scores — Before vs. After Treatment

DISCUSSION

1. Pain Management Efficacy of Marma Tantra

The study demonstrates that Marma Tantra focusing on Janu Marma points has a highly significant effect in reducing knee pain in Janu Sandhigatavata/knee OA. The dramatic reduction in Sandhi Shoola grades (85% Grade 3 → 0% Grade 3 after treatment) and VAS scores ($p < 0.00001$) corroborates the classical Ayurvedic claim that Marma Tantra effectively regulates Vata Dosha — the primary causative factor in degenerative joint diseases.[3,4]

The neurophysiological mechanisms likely operative in Marma Tantra include:

1. Mechanoreceptor stimulation at Janu Marma sites activating A-beta afferents that gate-control pain transmission at the spinal cord dorsal horn (Melzack-Wall gate control theory);
2. Endogenous opioid (beta-endorphin, enkephalin) release triggered by rhythmic deep-pressure stimulation;
3. Modulation of substance P and CGRP neuropeptide release from peripheral nociceptors through sustained marma compression;
4. Sympathetic tone regulation promoting local vasodilation and enhancing joint microcirculation and synovial fluid dynamics; and
5. Ashwagandha taila penetration providing direct analgesic and anti-inflammatory phytochemical activity at the marma site.[2]

As per the daily OPD attendance at DGM Ayurvedic Hospital, 20 patients presenting with primary signs and symptoms of Janu Sandhi Shoola were enrolled in the observational study. Before-and-after analysis of results with specific focus on pain management showed highly significant results, establishing Marma Tantra as an emerging clinical technique practicable at both OPD and IPD levels for pain management.

2. Functional Improvement

The improvements in WOMAC scores (Grade 4 → Grade 2 in 90% of patients) and knee ROM (mean flexion improvement 19.8°, $p < 0.01$) suggest that Marma therapy not only reduces pain but comprehensively enhances joint functionality. This holistic impact on joint health — promoting better circulation, reducing periarticular stiffness through the Mardan karma, and improving joint lubrication through Snehan — is consistent with the Ayurvedic understanding of Marma stimulation as a technique that restores normal Prana flow through Sira (vascular) and Snayu (ligamentous) channels.[33,34]

3. Comparison with Conventional Treatments

Conventional pharmacological interventions for knee OA — NSAIDs, COX-2 inhibitors, and intra-articular corticosteroid injections — provide temporary pain relief but carry significant risks: gastrointestinal bleeding (NSAID-associated, RR 3.8), cardiovascular events (selective COX-2 inhibitors), and accelerated chondrocyte apoptosis (repeated corticosteroids).[21,22] Marma Tantra, as a non-invasive, non-pharmacological approach with documented immediate-onset analgesia (within-session pain relief reported by patients), zero adverse events in the current series, and low cost (no consumables beyond Ashwagandha taila), offers a compelling complementary treatment profile — particularly for elderly patients with comorbidities limiting pharmacological options.

Limitations

This study was observational in nature with a single group (no control arm), a small sample size (n=20), and a short treatment and observation period (1 week). The absence of a randomised control group limits causal inference. Furthermore, the study did not assess long-term outcomes or recurrence rates, nor did it employ blinding procedures. These methodological limitations necessitate cautious interpretation of the findings. Future randomised controlled trials with larger sample sizes, control groups (e.g., sham-marma or physiotherapy comparators), longer follow-up (minimum 6 months), and objective neurophysiological outcome measures are needed to establish definitive efficacy evidence.

CONCLUSION

This observational study supports the effectiveness of Marma Tantra in managing pain and improving functional mobility in patients with Janu Sandhigatavata vis-à-vis knee Osteoarthritis. All primary outcome measures — Sandhi Shoola, VAS Scale, WOMAC Score, Walking Time, Sparsha Asahatva, Sandhi Atopa, and Knee ROM — demonstrated statistically highly significant improvement ($p < 0.00001$) after one week of Marma Tantra, with Sandhi Shotha showing significant improvement at $p = 0.0075$.

The significant reduction in pain (85% Grade 3 → 0% Grade 3 Shoola), improvement in WOMAC functional scores (90% Grade 4 → 90% Grade 2), and enhancement in knee flexion ROM (100.5° → 120.3°) highlight Marma Tantra as a promising non-invasive, cost-effective, and rapidly acting alternative for knee OA management — offering particular advantages for patients seeking alternatives

to pharmacological therapy or surgical intervention.

Marma Tantra requires much broader exploration in larger patient cohorts, in other painful musculoskeletal conditions (cervical spondylosis, low back pain, adhesive capsulitis), and with development of standardised Marma Tantra protocols. Its applications in improving blood circulation in deformities such as avascular necrosis, varicose eczema, and non-healing ulcers represent additional areas for future investigation. Further randomised controlled trials are essential to validate these findings and explore the long-term benefits of this ancient Ayurvedic therapeutic tradition.

REFERENCES

1. Mishra JN. Marma and Its Management. Reprint 2014 ed. Varanasi: Chaukhambha Orientalia; 2014. p. 88. Available from: http://www.vedicbooks.net.
2. Sharma RK, Chandra DC. Concept of Marma Massage in Ayurveda. Int J Creat Res Thoughts. 2020;ISSN:2320-2882. Available from: https://ijcrt.org.
3. Trikamji JA, editor. Charaka Samhita of Agnivesha with Ayurveda Deepika commentary by Chakrapanidatta. 2nd ed. Chikitsasthana; Vatavyadhi Chikitsa Adhyaya: Chapter 28, verse 11. Varanasi: Chaukhamba Orientalia; 2015. p. 29.
4. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Vatavyadhi Chikitsa Adhyaya: Chapter 28, verse 11. Varanasi: Chaukhamba Orientalia; 2015. p. 29.
5. Chaurasia BD. Human Anatomy: Regional and Applied Dissection and Clinical. 5th ed. Vol. 2. Chapter 12. New Delhi: CBS Publishers and Distributors; 2010. pp. 150-156.
6. Trikamji JA, editor. Charaka Samhita of Agnivesha. Sutrasthana; Chapter 12, verse 8. Varanasi: Chaukhamba Orientalia; 2015. p. 79.
7. Trikamji JA, editor. Sushruta Samhita of Sushruta with Nibandhasangraha commentary by Dalhanacharya. Sharira Sthana; Sharira Sankhya: Chapter 5, verse 16. Varanasi: Chaukhamba Orientalia; 2014. p. 365.
8. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Chapter 28, verse 56. Varanasi: Chaukhamba Orientalia; 2015. p. 619.
9. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Chapter 28, verse 15. Varanasi: Chaukhamba Orientalia; 2015. p. 693.
10. Trikamji JA, editor. Sushruta Samhita. Sutrasthana; Vranaprasna Adhyaya: Chapter 21, verse 19. Varanasi: Chaukhamba Orientalia; 2014. p. 103.
11. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Chapter 28, verse 16. Varanasi: Chaukhamba Orientalia; 2015. p. 616.
12. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Chapter 28, verse 56 [Ch.28/1]. Varanasi: Chaukhamba Orientalia; 2015. p. 158.
13. Upadhyaya Y, editor. Madavanidana of Sri Madhavakara with Madhukosha Sanskrit commentary. Vol. 1. Chapter 22. Varanasi: Chaukhamba Prakashan; Reprint 2016. p. 617.
14. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Chapter 28, verse 56. Varanasi: Chaukhamba Orientalia; 2015. p. 158.
15. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Chapter 28, verse 56. Varanasi: Chaukhamba Orientalia; 2015. p. 628.
16. Sharma S, editor. Ashtanga Sangraha of Vriddha Vagbhata with Sashilekha commentary. 3rd ed. Nidanasthana; Vatavyadhi Nidana: Chapter 15, verse 36. Varanasi: Chaukhamba Sanskrit Series Office; 2012. p. 416.
17. Agnivesha. Charaka Samhita. Part 2. 8th ed. Chikitsasthana; Chapter 28, shloka 38. Varanasi: Chaukhamba Sanskrit Sansthan; 2004. p. 697.
18. Trikamji JA, editor. Charaka Samhita. Chikitsasthana; Chapter 28, shlokas 72-74. Reprint 2008. Varanasi: Chaukhamba Sanskrit Sansthan; 2008.
19. Agnivesha. Charaka Samhita. Chikitsasthana; Chapter 28, shloka 19. 4th ed. Varanasi: Chaukhamba Sanskrit Sansthan; 1994. p. 617.
20. Trikamji JA, editor. Charaka Samhita of Agnivesha. Chikitsasthana; Chapter 28, verse 11. Varanasi: Chaukhamba Orientalia; 2015. p. 29.
21. Davidson S. Davidson's Principles and Practice of Medicine. 20th ed. Musculoskeletal Disorders. Edinburgh: Elsevier Churchill Livingstone; 2006. p. 1098.
22. Davidson S. Davidson's Principles and Practice of Medicine. 20th ed. Musculoskeletal Disorders. Edinburgh: Elsevier Churchill

Livingstone; 2006. pp. 1100-1101.

23. Shah S, editor. API Textbook of Medicine. 8th ed. Vol. 1. Mumbai: The Association of Physicians of India; 2008. pp. 282-283.

24. Shah S, editor. API Textbook of Medicine. 8th ed. Vol. 1. Mumbai: The Association of Physicians of India; 2008. pp. 282-283.

25. Murthy KRS, translator. Sushruta Samhita (English). Vol. I. Sharira Sthana: Chapter 6, verse 15. Reprint ed. Varanasi: Chaukhambha Orientalia; 2014. p. 107.

26. Murthy KRS, translator. Sushruta Samhita (English). Vol. I. Sharira Sthana: Chapter 6, verse 4. Reprint ed. Varanasi: Chaukhambha Orientalia; 2014. p. 104.

27. Murthy KRS, translator. Sushruta Samhita (English). Vol. I. Sharira Sthana: Chapter 6, verse 24. Reprint ed. Varanasi: Chaukhambha Orientalia; 2014. p. 110.

28. Murthy KRS, translator. Sushruta Samhita (English). Vol. I. Sharira Sthana: Chapter 6, verse 28. Reprint ed. Varanasi: Chaukhambha Orientalia; 2014. p. 116.

29. Gupta LP. Rachana Sharira: A Comprehensive Anatomical Approach (English). Vol. II. Varanasi: Chaukhambha Surbharati Prakashan; First edition 2015. p. 1213.

30. Murthy KRS, translator. Sushruta Samhita (English). Vol. I. Sharira Sthana: Chapter 6, verse 33. Reprint ed. Varanasi: Chaukhambha Orientalia; 2014. p. 117.

31. Lele A, Ranade S, Frawley D. Secrets of Marma (English). Reprint 2005 ed. Varanasi: Chaukhambha Sanskrit Pratishthan; 2005. p. 56.

32. Mishra JN. Marma and Its Management (English). Reprint 2014 ed. Varanasi: Chaukhambha Orientalia; 2014. p. 88.

33. Thatte DG. Acupuncture, Marma and Other Asian Therapeutic Techniques (English). Chapter 1. Reprint 2006 ed. Varanasi: Chaukhambha Orientalia; 2006. p. 5.

34. Joshi SK. Marma Science and Principles of Marma Therapy. Delhi: Vani Publications; 2010.