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CASE STUDY

Articular Cartilage Regeneration in the Knee Joint using the *Researchayu Kneeveda* Treatment Strategy (RKTS) in Patients with Osteoarthritis (OA)

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ABSTRACT

Osteoarthritis (OA) is a degenerative common complaint marked by pain, stiffness, and progressive cartilage degeneration. The Researchayu Kneeveda Treatment Strategy (RKTS) aims to restore common function by addressing systemic imbalances through the principles of *Saamta Nirmaan* (elimination of inflammation and metabolic poisons) and *Vata Shaman* (regulation of degeneration and creation of rejuvenescence). Conventional treatments give characteristic relief but don't address the underlying common degeneration. This retrospective experimental study evaluates the efficacy of RKTS in cases of knee OA over three weeks. 91 cases (168 treated joints) with OA grades II to IV were included. The primary ideal was to assess changes in common space range (JSW) after RKTS remedy, which incorporates systemic, original, and oral Ayurvedic treatments. The results showed a statistically significant 26.36% increase in JSW ($p< 0.001$). Also, cases endured notable reductions in pain, swelling, stiffness, and tenderness, as well as advancements in common crepitus and range of motion. There was no significant effect of age, gender, body weight, or comorbidities on JSW, although previous medical history had a significant impact ($p = 0.047$). RKTS remedy appears effective in promoting cartilage formation and perfecting common function in knee OA, but the retrospective design and small sample size limit generalizability. unborn prospective, randomized controlled trials with larger sample sizes and longer follow-ups are necessary to validate RKTS's efficacy and safety further.

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INTRODUCTION

Osteoarthritis (OA) is the prevalent chronic condition impacting the knee and hip joints, imposing a significant economic and social burden worldwide[1]. The global prevalence of OA is estimated at approximately 595 million cases amongst which 74.9% are knee OA[2]. As a degenerative condition, the primary treatment objectives in OA are symptom management and enhancing quality of life (QOL)[3]. Despite available therapies, about 33% of knee

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osteoarthritis patients eventually require total knee replacement[4].

The World Health Organisation (WHO) recommends the use of traditional Indian and South Asian Ayurvedic treatment options for knee OA[5]. Ayurvedic medicines are recognised for their utility in managing painful and inflammatory disorders[6]. Existing clinical evidence from well-structured exploratory and confirmatory studies demonstrates the significant clinical effectiveness of Ayurvedic therapies in treating OA[7]. Ancient Ayurvedic texts describe a condition known as *'Sandhigata Vata* (OA),' which resembles osteoarthritis, characterised by joint pain and swelling typically associated with aging[8-10].

The Researchayu Kneeveda Treatment Strategy (RKTS) is an innovative therapeutic approach that incorporates principles from traditional Indian Ayurvedic medicine with a modern clinical framework[11,12]. RKTS offers a holistic solution for knee OA by combining Ayurvedic (such as medicated massages and fomentation therapies) with oral herbal and herbo-mineral formulations, aiming to address the knee joint comprehensively rather than treating symptoms alone[13]. The formulations developed by TechClinic Connect are based on Ayurvedic principles, including *Agnideepan* (enhancement of digestive fire/metabolism), *Pachan* (digestion of metabolic toxins), *Shodhan* (systemic detoxification)*, and Bruhan* (tissue nourishment and anabolic therapy), with an emphasis on the nourishment and detoxification of *Asthi-Majja Dhatu* (bone and bone marrow tissues), and the use of *Rasayan* (rejuvenative therapies) to support tissue repair and longevity. This comprehensive strategy aims to restore the normal functioning of the knee joint without resorting to surgical or invasive methods. RKTS employs natural herbal and herbo-mineral supplements, alongside topical fomentation and *'Dhara*' (medicated oil pouring) to alleviate symptoms associated with *Sandhigata Vata* (OA). The present study analyses real-world data collected from four RKTS clinics located in Maharashtra, India, demonstrating improvements in joint space width and relief from osteoarthritis-related symptoms.

MATERIALS AND METHODS

Study design, setting and ethics

This retrospective analysis evaluated data from a 3-week treatment period across four Researchayu Kneeveda Clinics in Thane, Maharashtra, India, located in Vashi, Dombivli, Mulund, and Badlapur. The study received approval from an Institutional Ethics Committee (IEC) for Biomedical and Health Research, D. Y. Patil Deemed to be University School of Medicine, Navi-Mumbai (IEC No: DYP/IECBH/2024/422; 26/08/2024). The study complied with ICH-GCP E6(R2) 2016 (Step 4) standards, the New Drugs and Clinical Trials Rules (2019), and the Declaration of Helsinki (Taipei 2016). Given the retrospective nature of this analysis, the IEC

waived consent requirements, though written informed consent was obtained when feasible.

Study participants

The report includes data from 91 patients (168 knee joints) with symptomatic knee osteoarthritis (OA) treated with RKTS therapy, comprising 14 unilateral and 77 bilateral cases. Patients aged 18 to 70 years, of either gender, with grade II to IV OA in one or both knees (Kellgren–Lawrence classification) were eligible. Data of patients who had significant pain and difficulty in daily activities at their first clinic visit and who completed 3-4 week RKTS therapy were included for analysis. Patients with a history of knee trauma, severe bony defects, joint infections, insufficient clinical or radiographic data, or a history of alcohol, tobacco, or substance dependence were excluded.

Researchayu Kneeveda Treatment Strategy (RKTS)

The RKTS protocol combines systemic and topical therapies. Topically, the regimen includes daily applications of *Snehan* (oil massage) and *Pottali* (herbal dressing) for 40 minutes over the first week, followed by regen oil *Dhara*, where oil is poured over the knees (25 minutes per knee, totalling 50 minutes), over 20 sessions. Oral therapy consists of customised Ayurvedic medications tailored to each patient's profile. RKTS's primary objective is to repair articular cartilage. A preliminary detoxification therapy targets symptoms associated with *Saamta*, a state of systemic imbalance in Ayurveda characterised by the accumulation of undigested metabolic by-products (*Ama*) and disrupted *Agni* (digestive fire). These symptoms may include morning stiffness, knee and shin tenderness, limited range of motion, and digestive complaints such as *amlapitta* (bloating, burping, coated tongue, and anorexia).

RKTS follows a structured 21-day treatment protocol divided into three phases, aligned with the Ayurvedic principles of ***Saamta*** and ***Niramata***. These phases are: 1) Detoxification, 2) Intermediate, and 3) Regeneration. The Detoxification phase involves *Pottali Upakarma* and oral medications to promote *Deepana* (appetite stimulation), *Pachana* (digestion), and *Anulomak* (bowel regulation) using therapies such as *Adyant Shodhanam* and *Shunthi Siddha Eranda Oil*. *Shuddhi Lepa* is also applied externally to reduce inflammation at the microcellular level during the *Saamta* phase. Following *Saamta* reduction, intermediate therapy focuses on establishing *Niramata* (a state of balance and stability) through *Til Oil Dhara Upakrama* and oral medications with *Balya* (strengthening) and *Bruhana* (nourishing) properties. Additionally, mild *Deepana*, *Pachana*, and *Anulomak* effects help support digestion and metabolism.

The core regeneration therapy targets articular cartilage restoration. Externally, *Dhara Upakarma* uses *Bala-Ashwagandhadi* oil, while internally, nourishing and strengthening treatments are administered. Internal treatments include *Mahatikta Ghrita, Asthi Jeevanam, Atulya Asthi Shodhanam, Kaishor Guggul,* and

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Shunthi Siddha Erand oil (castor oil) in graduated doses to optimise joint regeneration. The oral therapies administered to the patients were as reported by Deolekar S. et al (2024)[14]. These medications are well-documented in Ayurvedic literature[15]. These medications possess analgesic, anti-inflammatory, and immunomodulatory properties that support overall health and have been extensively used by Ayurvedic practitioners to manage immunoinflammatory and degenerative conditions. According to Ayurvedic principles, enhancing digestion and metabolism is a critical objective in the treatment of arthritis[16].

Diagnosis as per Ayurveda

The Ayurvedic diagnosis involved evaluation of imbalances, or "*dushti*" (vitiation), present in the body's tissues and systems. As per Ayurveda, "*Asthidushti*" refers to the imbalance in *Asthi Dhatu* (the bone tissue) which leads to brittle bones, joint pain, and other skeletal issues.

Clinical diagnosis of OA

The clinical diagnosis of OA in patients was made based on the Kellgren-Lawrence (KL) classification, ranging from Grade II to IV, involving one or both knee joints[17]. Joints classified as grade 0 exhibit no joint space narrowing (JSN) or reactive changes. Grade 1 shows questionable JSN with potential osteophytic lipping. Grade 2 presents clear osteophytes and possible JSN. Grade 3 features moderate osteophytes, definite JSN, some sclerosis, and potential bone-end deformities. Grade 4 joints display large osteophytes, significant JSN, severe sclerosis, and pronounced bone-end deformities.

Radiograph of knee joints (X-ray)

X-ray radiographs for Joint Space Width (JSW) were taken at the baseline and the end of the study. JSW is considered the primary structural marker of knee osteoarthritis. The reduction in JSW and joint space narrowing occurs due to either wear and tear or inflammatory processes within the joint's microenvironment. Radiography has comparable effectiveness in diagnosing and depicting the accurate structural characteristics of the knee cartilage. Bilateral knee X-rays in the anteroposterior (AP) weight-bearing view were taken for all patients at the start and end of therapy. This specialised projection evaluates the knee joint, distal femur, proximal tibia, fibula, and patella, providing critical information on JSW and disease progression[18].

Primary outcome

The primary outcome of this study is the change in joint space width (JSW) of the affected knee, measured from baseline to 3-week RKTS therapy. JSW reduction and joint space narrowing can result from wear and tear or inflammatory processes in the joint's microenvironment. Radiography is known to be effective in diagnosing and depicting the structural characteristics of the knee joint[14]. The measurement of joint space width was conducted using radiological images of the treated joint[18]. The knee anteroposterior (AP) weight-bearing view serves as a specialised projection for

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evaluating the knee joint, distal femur, proximal tibia and fibula, and patella[19].

High-resolution images in the anteroposterior (AP) view of the knee joints were captured and uploaded to the Microsoft Windows-based software FIJI version 2.9.0 (ImageJ, developed by NIH). ImageJ is widely utilised for analysing images to measure various dimensions[20-23]. The images were set to a resolution of 1200 x 1000 pixels, calibrated to a scale of 1000 nanometres (nm). Vertical dimensions were measured in millimetres at five designated points (T1 to T5) within the joint space. T1 was at the widest point on the medial side, T5 on the lateral side, T3 at the midline's widest point, and T2 and T4 at the midpoints between T1-T3 and T3-T5, respectively. Five width measurements were taken, and the mean JSW was calculated as the arithmetic average of these values.

Secondary outcomes

The secondary outcomes included changes from baseline in the composite symptom score, which sums the scores for joint pain, swelling, tenderness, and stiffness, as well as the crepitus score, shin pain score, and knee joint range of motion (ROM). Data on all symptom scores were collected at baseline, week 1, week 2, and week 3 (end of treatment). Clinicians assessed symptom severity—joint pain, swelling, tenderness, stiffness, crepitus, tibial pain, and shin pain—during patient visits using a four-point Likert scale: 0 for no symptoms, 1 for mild, 2 for moderate, and 3 for severe symptoms. The knee joint ROM was classified as follows: 0 for free movement, 1 for slight restriction, 2 for moderate restriction, and 3 for severe restriction.

Patient data

Baseline demographic data were collected from patients, including age, gender, weight, dietary habits, and personal habits. Additionally, information on comorbidities, previous medical conditions, and surgical history was recorded. Laboratory data were gathered at baseline and again at the end of treatment (weeks 3), depending on availability.

Sample size

Patient data from four clinics were reviewed for eligibility. A total of 102 records for patients treated for knee OA from May 2022 to July 2024 were screened. Incomplete data were found in 11 records, leaving at least one knee joint's data available for 91 patients. Ultimately, 91 patients were included in the final analysis, comprising 168 knee joints (91 right and 77 left). As this is an exploratory study, the sample size was not based on specific assumptions or calculations.

Statistical methods and data analysis

Data for age, body weight, joint space width (JSW), and symptom scores are presented as means with standard deviations (SD). Categorical and nominal data are shown as counts and percentages, with 95% confidence intervals (CI) provided where applicable. Changes in JSW and symptom scores from baseline are expressed as means with SD. Baseline JSW and symptom scores were compared to post-treatment values using repeated measures analysis of variance (ANOVA), with post-hoc comparisons conducted

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via t-tests. A general linear model (GLM) was used to adjust JSW and clinical symptom scores (CSS) for factors including age, gender, body weight, occupation, and comorbidities (diabetes, hypertension, dyslipidemia). The Wilcoxon test assessed ranking data to compare baseline and end-of-treatment (EoT) scores. All analyses used two-sided tests with an alpha level of 0.05.

Table 1 Profile of patients with osteoarthritis of knee (n=91)

		Mean	SD.
Demography	Age (yrs.)	60.31	9.02
	Weight (kg.)	72.00	11.37
		No.	%
Gender	Male	19	20.88%
	Female	72	79.12%
Occupation	Housewife	59	64.84%
	Service	08	8.79%
	Retired	14	15.38%
	Business	03	3.30%
	N/A	07	7.69%
OA grade (Baseline)	Grade 2 (Definite osteophytes)	50	54.95%
	Grade 3 (Moderate osteophytes)	32	35.16%
	Grade 4 (Large osteophytes)	09	9.89%
History	Medical history	36	39.56%
	Surgical history	35	38.46%
	Family history	25	27.47%
Comorbidity	Present	54	59.34%
	Absent (No comorbidity)	37	40.66%
No of comorbidities	No comorbidity	37	40.66%
	One Comorbidity	27	29.67%
	Two Comorbidity	17	18.68%
	Three Comorbidity	10	10.99%
Comorbid condition	Diabetes mellitus	25	27.47%
	Hypertension	39	42.86%
	Dyslipidemia	05	5.49%
	Respiratory disorders	05	5.49%
	Thyroid disorders	09	9.89%
	Others	08	8.79%
Diet	Vegetarian	25	27.47%
	Non-Vegetarian	05	5.49%
	Mixed	61	67.03%
Bowel habits	Normal	78	85.71%
	Constipation	09	9.89%
	Diarrhoea	04	4.40%
	Other(s)	00	0.00%
C-Reactive protein	Elevated	13	14.29%
	Normal	78	85.71%
RA factor	Negative	89	97.80%
	Positive	02	2.20%
Anti-nuclear antibody (ANA)	Negative	84	92.31%
	Positive	7	7.69%
Joint Involvement and Laterality	Unilateral (affecting one side)	24	26.37%
	Bilateral (affecting both sides)	77	84.62%
	Left side affected	77	84.62%
	Right side affected	91	100.00%

RA: Rheumatoid Arthritis; SD: Standard deviation; OA: Osteoarthritis; KL: Kellgren–Lawrence

RESULTS AND DISCUSSION The demographic and clinical profiles of patients (n=91) who completed the 3-week RKTS therapy is depicted in **Table 1**. Among these patients, 54

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had comorbidities, with hypertension (42.86%) and diabetes (27.47%) being the most common. The cohort was predominantly female (79.12%), and the distribution of osteoarthritis (OA) severity according to Kellgren–Lawrence grading was balanced, with roughly one-third in grades 2, 3, and 4. A family history of OA was reported by 25 patients (27.47%). Rheumatoid factor was positive in 2.20% of patients, elevated C-reactive protein was found in 14.29%, and antinuclear antibodies were detected in 7.69%.

The descriptive statistics for joint space width (JSW) at baseline and post-treatment, both unadjusted and adjusted for factors including age, gender, body weight, occupation, and comorbidities, are summarised in **Table 2**. A statistically significant increase ($p<0.001$) was noted following RKTS therapy, resulting in an overall 26.36% increase. General Linear Model (GLM) analysis revealed no significant influence of age ($p=0.313$), gender ($p=0.961$), body weight ($p=0.412$), occupation ($p=0.645$), concurrent conditions ($p=0.479$), diabetes ($p=0.619$), or dietary habits ($p=0.632$) on JSW; however, prior medical history significantly impacted JSW ($p=0.047$).

Composite symptom scores, including joint pain, swelling, stiffness, and tenderness, significantly decreased from baseline to the end of treatment ($p<0.001$), indicating substantial improvement in all joint symptoms. Improvements were also noted in joint crepitus and knee joint range of motion. Details are provided in **Table 3**.

Table 2 Joint space width (mm) in osteoarthritis of knee (n=168)

	N	*Mean (SD)*	*Adjusted Mean[#] (95% C.I. for adjusted mean)*	*p**
Baseline				
Grade 2 OA	74	3.76 (1.47)	3.81 (3.49 to 4.14)	-
Grade 3 OA	74	3.59 (1.20)	3.55 (3.23 to 3.87)	-
Grade 4 OA	20	3.67 (1.77)	3.63 (3.01 to 4.26)	-
All patients	168	3.68 (1.39)	3.66 (3.41 to 3.92)	-
End of Treatment				
Grade 2 OA	74	4.35 (1.26)	4.37 (4.07 to 4.68)	<0.001
Grade 3 OA	74	4.67 (1.43)	4.65 (4.34 to 4.95)	<0.001
Grade 4 OA	20	5.73 (1.29)	5.71 (5.11 to 6.30)	<0.001
All patients	168	4.65 (1.40)	4.91 (4.67 to 5.15)	<0.001
Change from baseline		*Mean Change (SD)*	*% change (SD)*	
Grade 2 OA	74	0.58 (0.79)	15.69	-
Grade 3 OA	74	1.10 (0.77)	30.07	-
Grade 4 OA	20	2.07 (0.75)	56.13	-
All patients	168	0.99 (0.90)	26.36	-

SD: Standard deviation; C.I.: Confidence interval; OA: Osteoarthritis

[#] Adjusted for Age (yrs.) = 60.208, Gender = 1.80, Weight (kg.) = 72.286, Occupation = 1.81, Medical history= 1.60, Surgical history= 1.62, Comorbidity = 1.40, No of comorbidities = 0.98, Diabetes = 0.27, Hypertension = 0.43, Family History= 1.74, Diet= 2.38, Bowel habits= 1.19.

** p: repeat measures ANOVA (baseline versus end of treatment).*

This retrospective analysis highlights the potential of the RKTS as a new integrative therapy for knee OA. Significant advancements were observed in JSW, composite symptom

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Table 3 Composite symptom scores, joint crepitus, ROM for knee joint in osteoarthritis (n=168)

				Change from baseline			*Effect size***
		Mean	*SD*	*Mean*	*95% C.I.*	*p**	
Composite Symptom Score	Baseline	4.23	2.44	-	-		
	Week 1	2.36	1.63	1.87	1.47 to 2.27	<0.001	0.766
	Week 2	1.84	1.16	2.39	1.98 to 2.79		0.980
	EoT	1.85	1.70	2.38	1.91 to 2.84		0.975
Joint crepitus	Baseline	0.89	0.43	-	-		
	Week 1	0.67	0.51	0.21	0.13 to 0.30	<0.001	0.766
	Week 2	0.65	0.52	0.24	0.15 to 0.33		0.980
	EoT	0.97	0.58	-0.08	-0.19 to 0.02		0.975
ROM	Baseline	0.33	0.64	-	-		
	Week 1	0.20	0.45	0.13	0.03 to 0.23	<0.001	0.488
	Week 2	0.08	0.27	0.23	0.13 to 0.33		0.558
	EoT	0.07	0.25	0.25	0.15 to 0.35		0.186

ROM: Range of motion; SD: Standard deviation; EoT: End of treatment; C.I.: Confidence interval
** p: repeat measures ANOVA (baseline versus end of treatment); ** Effect size (Cohen's D) for change from baseline*

scores, and functional mobility following a structured 3-week RKTS intervention. These findings are encouraging, given that effective cartilage repair remains a major challenge in OA management, with existing non-surgical and surgical interventions often failing to restore normal joint anatomy and function[24]. Emerging regenerative medicine approaches, including stem cell and growth factor therapies, have shown promise in preclinical models[25,26], yet translation into clinical practice remains limited by challenges in efficacy, delivery, and regulatory hurdles[27].

The pathophysiology of OA is complex, with chronic joint inflammation playing a significant role in the disease's onset and progression[27]. This inflammation is mediated by various immune cells, including T cells, neutrophils, and macrophages[28]. Given that cytokines and chemokines contribute to cartilage damage, the use of NF-kB pathway inhibitors, such as BAY11-7082, may help restore IL-1β-inhibited chondrogenesis in cartilage stem cells and slow the progression of OA[29]. However, these therapies primarily focus on preventing further cartilage damage and do not facilitate the repair of existing damage.

The RKTS is a distinctive 21-day therapeutic regimen based on the traditional Ayurvedic system of medicine in India. This approach integrates systemic therapy, local treatment (including dressing with traditional *Pottali* using medicated oils), and oral therapy. The therapy begins with detoxification to alleviate the inflammatory condition known as *Saamta* (flare) and address related digestive issues such as *amlapitta* (characterised by bloating, burping, a white-coated tongue, and anorexia). Following the reduction of *Saamta*, intermediate therapy is implemented to achieve a state of *Niramata* (remission). This stage includes the external application of *Til Oil Dhara Upakrama* and the internal administration of medicines with *Balya* (strengthening) and *Bruhana* (nourishing) properties, alongside medications that possess mild *Deepana* (digestive), *Pachana* (metabolic),

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and *Anulomak* (regulatory) effects. The regeneration therapy combines drugs aimed at reducing inflammation and promoting cartilage regeneration, customised according to the patient's profile based on Ayurvedic principles[15]. These medications exhibit analgesic, anti-inflammatory, and immunomodulatory properties, contributing to overall health and have been commonly utilised by Ayurvedic practitioners to treat immunoinflammatory and degenerative disorders. Central to Ayurvedic principles is a focus on the gastrointestinal tract, with enhancing digestion and metabolism as key objectives in arthritis management[30].

This exploratory study provides a retrospective analysis of data from 91 patients (168 treated joints) with knee osteoarthritis (OA) who received treatment through the Researchayu Kneeveda Treatment Strategy (RKTS) at the participating sites. The final analysis included patients of either gender with Kellgren–Lawrence grades II to IV OA. Patients with a history of trauma, bone defects, or infection were excluded. Joint space width was evaluated using ImageJ software on digital radiographic images of the knee joints. While cartilage mapping via Sodium MRI (Magnetic Resonance Imaging) can serve as a non-invasive biomarker for diagnosing and monitoring cartilage repair[31,32].

In the present study, a 26.36% mean increase in JSW was observed after 3 weeks of RKTS therapy. The final mean JSW measurements approached near-normal levels as described in healthy Indian adults. The study reported that the mean medial and lateral joint space widths of healthy Indian adult knee joints were 5.34 (1.26) mm and 5.21 (1.04) mm, respectively, on the left side, with similar measurements on the right side. In our study, the mean (SD) joint space width in OA-affected joints was reduced to 3.68 (1.39) mm, which increased significantly ($p<0.001$) by 0.99 (0.90) mm to 4.65 (1.40) mm by the end of the 3-week therapy[33]. Additionally, RKTS therapy significantly improved ($p<0.001$) cartilage damage in 92.26% (155/168) of joints by the end of treatment. Improvement in composite symptom scores, including pain, stiffness, tenderness, crepitus, and range of motion, further supports the functional benefits of the intervention. Importantly, 73.5% of patients reported over 50% pain relief by the end of treatment, suggesting clinically meaningful outcomes.

The strengths of this study include its design, which incorporated real-world data from patients treated across multiple clinics for analysis. However, the limitations include its retrospective design and empirical sample size, which was determined by convenience sampling based on data availability. Given the lack of pharmacological options for cartilage regeneration in OA-affected joints, RKTS therapy appears to be a promising approach to enhance joint anatomy, function, and overall quality of life.

The study suggests that RKTS can be an effective treatment for knee OA, especially in the short term, but its generalizability to broader

populations, particularly outside of India or in different healthcare systems, remains uncertain. Further prospective, multi-centre randomised controlled trials with larger, more diverse samples and longer follow-up periods would be needed to validate these findings and assess the broader applicability of RKTS in various settings.

CONCLUSION

The present study demonstrates that the RKTS, grounded in classical Ayurvedic principles, may serve as a promising integrative approach for the management of knee OA. Significant improvements in joint space width, symptom severity, and functional mobility were observed following a structured 3-week intervention. By addressing systemic imbalances through detoxification (*Shodhana*), metabolic correction *(Agnideepan, Pachana*), and tissue rejuvenation (*Bruhana*, *Rasayana* therapies), RKTS offers a holistic and potentially regenerative solution for OA, beyond symptomatic relief. The findings support the ancient Ayurvedic understanding of *Sandhigata Vata* while aligning with modern perspectives on cartilage degeneration and chronic inflammation. Although the retrospective design and sample size limitations warrant cautious interpretation, the favourable outcomes highlight the need for larger, prospective, randomised controlled trials. RKTS may bridge traditional wisdom and modern science, offering new hope in the evolving landscape of osteoarthritis management.

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COMPETING INTERESTS

The authors – Dr. Sandip Mali, Dr. Shweta Deolekar, and Dr. Poorva Sawant– are employed with TechClinic Connect Pvt Ltd. The other author declares no conflict of interest.

DATA AVAILABILITY

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

DECLARATION OF GENERATIVE AI IN SCIENTIFIC WRITING

No generative AI, AI-assisted technologies, or AI tools were used in the creation of this manuscript.

AUTHOR CONTRIBUTIONS

SD, PS – Data collection, Investigation, SM, SD, PS, GG - Manuscript- writing original draft, manuscript review and editing and formal analysis.

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