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A COMPARATIVE CLINICAL STUDY TO EVALUATE THE EFFICACY OF JANU BASTI AND JANU DHARA WITH SHUDH BALA TAIL ON JANUSANDHIGATA VATA W.S.R.TO OSTEOARTHRITIS OF KNEE JOINT

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ABSTRACT

Background: Osteoarthritis of the knee is a highly prevalent degenerative whole-joint disorder that produces pain, stiffness, crepitus, reduced walking capacity and functional limitation. Modern understanding considers knee osteoarthritis as a disease involving articular cartilage, subchondral bone, synovium, ligaments, peri-articular muscles and low-grade inflammatory mediators rather than only a disorder of cartilage wear.[1-5] In Ayurveda, the comparable condition is Janusandhigata Vata, a Vata-predominant disorder occurring due to Vata prakopa, dhatu-kshaya and depletion of Shleshaka Kapha, producing sandhi shoola, shotha, stambha, atopa/crepitus and painful movement.[10-14] Janu Basti and Janu Dhara are local snehana-swedana based Panchakarma procedures intended to pacify Vata and nourish the knee joint. **Aim:** To compare the clinical efficacy of Janu Basti and Janu Dhara with Shuddha Bala Taila in the management of Janusandhigata Vata with special reference to osteoarthritis of the knee joint. **Materials and Methods:** A randomized, double-arm comparative clinical study was conducted on 40 patients fulfilling the diagnostic criteria of Janusandhigata Vata/knee osteoarthritis. Patients were divided equally into two groups. Group A received Janu Basti with Shuddha Bala Taila and Group B received Janu Dhara with Shuddha Bala Taila for 14 days. Assessment was performed using subjective parameters - pain, oedema, crepitus, stiffness and tenderness - and objective parameters - walking distance and knee joint movement. Data were analysed using paired t-test for intra-group comparison and unpaired t-test for inter-group comparison. **Results:** Janu Basti produced 55.00% relief in pain, 85.71% in oedema, 63.63% in crepitus, 66.67% in stiffness, 94.74% in tenderness, 78.94% in walking distance and 80.00% in knee movement. Janu Dhara produced 62.50% relief in pain, 75.00% in oedema, 67.86% in crepitus, 75.00% in stiffness, 90.00% in tenderness, 80.00% in walking distance and 33.33% in knee movement. Inter-group comparison showed statistically significant superiority of Janu Basti only in stiffness, while most other parameters were comparable. **Conclusion:** Both Janu Basti and Janu Dhara with Shuddha Bala Taila are effective and safe procedures for symptomatic and functional improvement in Janusandhigata Vata/knee osteoarthritis. Janu Basti appears more useful in stiffness-dominant chronic cases due to longer oil retention and deeper snehana, whereas Janu Dhara may be especially useful in pain and tenderness-dominant presentations due to continuous soothing thermotherapeutic action.

KEYWORDS: Janusandhigata Vata, Sandhigata Vata, osteoarthritis, knee joint, Janu Basti, Janu Dhara, Shuddha Bala Taila, Panchakarma, snehana, swedana.

INTRODUCTION

Osteoarthritis (OA) is the most common degenerative joint disease and an important cause of chronic pain and disability worldwide. The Global Burden of Disease analysis estimated that about 595 million people were living with osteoarthritis in 2020, corresponding to approximately 7.6% of the global population, with knee osteoarthritis being one of the most frequent and disabling sites.[1] The disease burden is expected to rise further with population ageing, obesity, sedentary habits and prolonged mechanical loading of weight-bearing joints.[1,2]

Modern scientific understanding has moved beyond the older concept of OA as a simple "wear and tear" disease. It is now regarded as a heterogeneous whole-joint disorder involving degradation of articular cartilage, subchondral bone remodelling, osteophyte formation, synovial inflammation, meniscal and ligamentous changes, peri-articular muscle dysfunction and pain sensitisation.[2-5] Inflammatory mediators such as cytokines, chemokines, adipokines, neuropeptides and matrix-degrading enzymes participate in cartilage catabolism and synovial irritation.[4,5] These biological changes correlate clinically with pain, morning or activity-related stiffness, crepitus, swelling, reduction of range of motion and impaired walking ability.

The knee is a major weight-bearing synovial joint. Its articular cartilage has limited intrinsic regenerative capacity because chondrocytes are sparsely distributed and the cartilage is avascular. Synovial fluid provides lubrication and nutrition to the cartilage, while peri-articular muscles and ligaments contribute to joint stability. Disturbance in any of these structures can produce abnormal biomechanical stress, pain and progressive degeneration.[2,3]

In Ayurveda, the comparable condition is Janusandhigata Vata, a localized form of Sandhigata Vata affecting the knee joint. Acharya Charaka describes Sandhigata Anila with features such as Vata-purna-driti-sparsha, shotha and pain on akunchana-prasarana, which correspond clinically to swelling, crepitus and painful flexion-extension of the joint.[10] Sushruta and Madhava Nidana also describe Sandhigata Vata under Vatavyadhi, with sandhi shoola, shotha, atopa/stiffness and restricted movement as important manifestations.[11,12] The thesis identifies Janusandhigata Vata as a Vata-dominant disorder caused primarily by dhatu-kshaya and depletion of Shleshaka Kapha, leading to pain, stiffness, crepitus and impaired joint movement.

The Ayurvedic pathogenesis may be understood as follows: due to age, overuse, ruksha ahara-vihara, excessive exertion, obesity-related mechanical burden or dhatu-kshaya, Vata becomes aggravated and localizes in the knee joint. Depletion of Shleshaka Kapha reduces snigdhatva and lubrication, while asthi-majja dhatu involvement produces degenerative changes. This creates a clinical state similar to cartilage wear, loss of synovial lubrication, subchondral stress and neuromuscular dysfunction described in modern osteoarthritis.

Conventional management of knee osteoarthritis includes patient education, weight control, exercise therapy, topical or oral non-steroidal anti-inflammatory drugs, intra-articular injections and, in advanced disease, joint replacement. Current guidelines emphasise non-pharmacological and multimodal management; however, long-term analgesic use may carry gastrointestinal, renal and cardiovascular risks, while surgery may be costly or unsuitable for many patients.[6] Therefore, safe local therapies that reduce pain, improve mobility and minimise drug dependence are clinically relevant.

Janu Basti and Janu Dhara are local Panchakarma procedures based on sthanika snehana and swedana. Janu Basti involves retention of warm medicated oil over the knee joint for a defined duration, providing sustained contact, local warmth, lubrication and deeper oleation. Janu Dhara involves continuous pouring of warm medicated oil over the knee, providing rhythmic thermotherapeutic stimulation, mild oleation, improved circulation and pain modulation. Thermotherapy has been reported to improve pain, stiffness and functional capacity in knee osteoarthritis through increased blood flow, muscle relaxation, reduced joint viscosity and modulation of pain pathways.[7,8]

Shuddha Bala Taila was selected because Bala is classically considered balya, brimhana and Vata-shamaka, and its oil-based formulation provides snigdha, guru and mridu qualities that counteract the ruksha, khara and sheeta properties of vitiated Vata.[15,16] Pharmacological studies on Sida cordifolia indicate analgesic and anti-inflammatory potential, supporting its use in painful degenerative joint disorders.[9] The present study was therefore undertaken to compare the efficacy of Janu Basti and Janu Dhara with Shuddha Bala Taila in Janusandhigata Vata with special reference to osteoarthritis of the knee joint.

AIM AND OBJECTIVES

Aim

To evaluate and compare the efficacy of Janu Basti and Janu Dhara with Shuddha Bala Taila in the management of Janusandhigata Vata with special reference to osteoarthritis of the knee joint.

OBJECTIVES

1. To evaluate the effect of Janu Basti with Shuddha Bala Taila on Janusandhigata Vata.
2. To evaluate the effect of Janu Dhara with Shuddha Bala Taila on Janusandhigata Vata.
3. To compare and ascertain the relative efficacy of Janu Basti and Janu Dhara with Shuddha Bala Taila.
4. To observe safety, tolerability and clinical applicability of both local Panchakarma procedures.

MATERIALS AND METHODS

Study design and sample

The study was a randomized, double-arm comparative clinical study. A total of 40 patients fulfilling the diagnostic criteria of Janusandhigata Vata/knee osteoarthritis were selected using simple random sampling and divided equally into two groups of 20 patients each. Group A received Janu Basti and Group B received Janu Dhara with Shuddha Bala Taila for 14 days.

Ethical clearance and registration
The dissertation states that the study was cleared by the Institutional Ethics Committee vide Memo No. 351 dated 20/02/2023 and registered with CTRI number CTRI/2024/04/068885.

Diagnostic approach
Diagnosis was based on clinical features of Janusandhigata Vata and knee osteoarthritis, including pain, swelling/oedema, crepitus, stiffness, tenderness, reduced walking capacity and restriction of knee movement. The assessment was performed through a specially designed case proforma.

Interventions
Group A: Janu Basti with Shuddha Bala Taila. Warm Shuddha Bala Taila was retained locally over the affected knee joint within a prepared boundary for the specified treatment duration. The procedure provided sustained sthanika snehana and swedana.

Group B: Janu Dhara with Shuddha Bala Taila. Warm Shuddha Bala Taila was poured continuously over the knee joint in a rhythmic manner. The oil was collected and reheated to maintain suitable warmth during the procedure.

In both groups, local cleaning, preparation of the patient, maintenance of lukewarm temperature, gentle wiping after therapy, avoidance of cold exposure, rest and appropriate post-procedure advice were followed.

Assessment criteria
Assessment was based on changes in subjective and objective parameters before and after treatment. Subjective parameters were pain, oedema, crepitus, stiffness and tenderness. Objective parameters were walking distance and knee joint movement. Statistical analysis was done using paired t-test within each group and unpaired t-test for comparison between the groups.

RESULTS

Effect of Janu Basti with Shuddha Bala Taila
Janu Basti produced statistically significant improvement in all subjective parameters. Pain improved by 55.00%, oedema by 85.71%, crepitus by 63.63%, stiffness by 66.67% and tenderness by 94.74%. In objective parameters, walking distance improved by 78.94% with statistical significance, while knee movement improved by 80.00% but remained statistically non-significant.

Parameter	BT	AT	Mean difference	Relief (%)	P value
Pain	2.00	0.90	1.10	55.00	<0.0001
Oedema	0.70	0.10	0.60	85.71	<0.0001
Crepitus	1.65	0.60	1.05	63.63	<0.0001
Stiffness	0.75	0.25	0.50	66.67	<0.001
Tenderness	0.95	0.05	0.90	94.74	<0.0001
Walking distance	0.95	0.20	0.75	78.94	<0.01
Knee movement	0.25	0.05	0.20	80.00	>0.05

Effect of Janu Dhara with Shuddha Bala Taila
Janu Dhara also produced clinically meaningful and statistically significant improvement in most parameters. Pain improved by 62.50%, oedema by 75.00%, crepitus by 67.86%, stiffness by 75.00% and tenderness by 90.00%. Walking distance improved by 80.00% with statistical significance, while knee movement improved by 33.33% but remained statistically non-significant.

Parameter	BT	AT	Mean difference	Relief (%)	P value
Pain	1.60	0.60	1.00	62.50	<0.0001
Oedema	0.60	0.15	0.45	75.00	<0.01
Crepitus	1.40	0.45	0.95	67.86	<0.0001
Stiffness	0.20	0.05	0.15	75.00	>0.01
Tenderness	1.00	0.10	0.90	90.00	<0.0001
Walking distance	0.50	0.10	0.40	80.00	<0.05
Knee movement	0.15	0.10	0.05	33.33	>0.05

Inter-group comparison
On inter-group comparison, pain, oedema, crepitus, tenderness and objective parameters showed statistically insignificant differences between the two groups, indicating broadly comparable efficacy. Stiffness showed a statistically significant difference favouring Janu Basti ($p<0.05$), suggesting better effect of retained warm oil in stiffness-dominant chronic degeneration.

Parameter	Mean improvement Group A	Mean improvement Group B	P value	Interpretation
Pain	1.10	1.00	>0.05	Comparable
Oedema	0.60	0.45	>0.05	Comparable
Crepitus	1.05	0.95	>0.05	Comparable
Stiffness	0.50	0.15	<0.05	Significant; favours Janu Basti
Tenderness	0.90	0.90	>0.05	Comparable

DISCUSSION

The results show that both Janu Basti and Janu Dhara with Shuddha Bala Taila produced significant symptomatic and functional improvement in Janusandhigata Vata/knee osteoarthritis. The improvement in pain, tenderness, swelling, crepitus and walking ability indicates that these therapies influence both the subjective pain experience and functional capacity of the knee joint.

From the Ayurvedic perspective, Janusandhigata Vata is fundamentally a Vata-dominant degenerative disease. Vata possesses ruksha, laghu, sheeta, khara, sukshma and chala properties. In the joint, these qualities manifest as dryness, roughness, pain, crepitus, stiffness and instability. Depletion of Shleshaka Kapha reduces lubrication and cushioning of the joint, while asthi-majja dhatu kshaya contributes to structural degeneration.[10-14] Sthanika snehana and swedana are therefore logical because they provide snigdha, ushna, mridu and sukshma effects, directly opposing the pathological qualities of Vata.[15]

Modern pathophysiology offers a parallel explanation. Knee OA involves cartilage matrix degradation, synovial inflammation, subchondral bone changes and inflammatory mediator activity. Pain may arise not only from cartilage damage but also from synovium, subchondral bone, periosteum, ligaments, menisci and peri-articular muscle spasm.[2-5] Local heat and oil therapy can influence pain by increasing local circulation, relaxing muscles, improving tissue extensibility, reducing joint stiffness and modulating peripheral pain pathways.[7,8]

Janu Basti showed superior effect in stiffness. This may be attributed to sustained retention of warm medicated oil over the knee joint, allowing prolonged contact and deeper penetration of heat and lipid-soluble active principles. The local retention may reduce rukshata and kharatva, support shleshaka function and soften peri-articular tissues. The statistically significant superiority in stiffness supports its role in chronic stiffness-dominant presentations.

Janu Dhara showed comparatively higher percentage relief in pain and very good improvement in tenderness. Continuous streaming of warm oil provides repeated thermal and tactile stimulation, which may produce counter-irritant action, improve superficial circulation, reduce hyperalgesia and relax peri-articular muscles. It may be especially valuable in pain-dominant and tenderness-dominant cases where soothing sensory input is clinically desirable.

The functional improvement in walking distance in both groups is clinically important. Even when structural degeneration cannot be reversed in a short 14-day period, reduction in pain and stiffness can improve confidence, gait efficiency and mobility. The non-significant change in knee joint movement in both groups indicates that short-term therapies can improve symptoms more readily than structural limitations caused by cartilage loss, osteophytes or long-standing joint space narrowing.

Shuddha Bala Taila may contribute additional therapeutic value. Bala is classically described as Vata-shamaka, balya and brimhana, and taila as a chief sneha substance is particularly suitable for Vata disorders.[15,16] Experimental evidence for Sida cordifolia suggests analgesic and anti-inflammatory activities, which may support reduction of pain and inflammation in degenerative joint conditions.[9]

The absence of major adverse effects is notable because knee osteoarthritis is often chronic and elderly patients may have comorbidities that limit prolonged systemic analgesic use. These local therapies may be used as safe adjunctive interventions along with weight control, exercise, physiotherapy and standard medical advice, in line with multimodal management principles.[6]

Probable Mode of Action

Ayurvedic mode of action

- Vata-shamana: Warm medicated oil counters ruksha, sheeta and khara qualities of vitiated Vata.
- Snehana: Snigdha guna improves local lubrication and reduces friction-like symptoms such as crepitus.
- Swedana: Local warmth reduces stiffness and supports better movement.
- Shleshaka Kapha support: Oil application may functionally supplement lubrication and cushioning at the joint.
- Dhatu-poshana: Bala and taila provide brimhana and balya effects in dhatu-kshaya dominant Sandhigata Vata.

Modern scientific mode of action

- Thermal effect: Local heat increases blood flow, improves tissue extensibility and reduces peri-articular muscle spasm.[7,8]

- Pain modulation: Repeated warmth and touch may reduce peripheral nociceptive input and improve pain threshold.
- Synovial effect: Warmth and gentle movement after therapy may reduce synovial fluid viscosity and improve joint lubrication.
- Anti-inflammatory support: Bala/Sida cordifolia has reported analgesic and anti-inflammatory activity, which may support symptomatic relief.[9]
- Functional effect: Reduced pain and stiffness improve walking capacity, confidence and daily activities.

CONCLUSION

The present randomized comparative clinical study demonstrates that both Janu Basti and Janu Dhara with Shuddha Bala Taila are effective in the management of Janusandhigata Vata with special reference to knee osteoarthritis. Janu Basti showed superior improvement in stiffness, most likely due to prolonged retention of warm medicated oil and deeper snehana. Janu Dhara showed very good relief in pain and tenderness, probably due to continuous soothing thermotherapeutic stimulation. Both therapies significantly improved walking distance and overall functional ability, while knee movement did not show statistically significant improvement within the short study duration.

The findings support the Ayurvedic rationale of local snehana-swedana in Vata-dominant degenerative joint disorders and correlate well with modern concepts of thermotherapy, pain modulation, synovial lubrication and peri-articular muscle relaxation. Larger multicentric trials with longer follow-up, WOMAC/KOOS/VAS scoring, radiological grading and biomechanical assessment are recommended for stronger validation.

Limitations

- The sample size was modest, with 40 patients.
- The treatment duration was short, limited to 14 days.
- Long-term follow-up was not performed.
- Radiological parameters such as Kellgren-Lawrence grading, joint-space measurement or MRI cartilage assessment were not included.
- Quality-of-life scales such as WOMAC or KOOS were not used.
- Only one oil formulation, Shuddha Bala Taila, was evaluated.

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