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Original Article

Ayurveda Section

Comparative Effectiveness of *Viddha-agnikarma* in Managing Lower Back and Knee Joint Pain: A Pilot Study

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ABSTRACT

Introduction: *Viddha-agnikarma* is a novel Ayurvedic method that combines *Viddhkarma* (piercing therapy) and *Agnikarma* (thermal cautery) to alleviate pain through targeted thermal stimulation. It offers an alternative pain management approach, particularly for chronic musculoskeletal conditions, by delivering localized relief without reliance on pharmacological treatments.

Aim: To evaluate the efficacy of *Viddha-agnikarma* in managing chronic pain associated with the lower back and knee joints in patients unresponsive to conventional therapies.

Materials and Methods: This was a prospective intervention pilot study conducted at Department of Shalya Tantra, Mahatma Gandhi Ayurveda College, Hospital and Research Centre, Wardha, Maharashtra, India, from February 2024 to July 2024. It included 12 patients with persistent lower back or knee pain resistant to standard treatments. Each patient received *Viddha-agnikarma* therapy every three days, totaling seven sessions, with follow-up evaluations on day 21. Pain levels were assessed using the Visual Analog Scale (VAS) at baseline, immediately post-treatment, and during follow-up. A comparison of the differences in initial and final mean scores was conducted, and the percentage improvement in pain scores was calculated to evaluate therapeutic efficacy.

Results: The study included 12 patients: seven males and five females, all from rural areas, with a mean age of 58±5.9 in Group A and 54.8±8.4 in Group B. VAS scores indicated a reduction from 8 to 0.33 for Lower Back Pain (LBP), and from 8 to 4 for knee pain. Although patients experienced some improvement in knee pain, the outcomes were less consistent and varied across individuals, indicating a need for further research into *Viddha-agnikarma*'s efficacy for knee pain.

Conclusion: *Viddha-agnikarma* emerged as a promising non pharmacological alternative for chronic pain management, particularly effective for LBP, with potential benefits over conventional treatments. This pilot study supports the integration of *Viddha-agnikarma* into Ayurvedic pain management practices. However, larger, randomised controlled trials are necessary to validate these findings and further explore its effectiveness, especially for knee pain management.

Keywords: Alternate treatment, Ayurveda, Pain management, Visual analog scale

INTRODUCTION

Chronic pain, particularly in the lower back and knees, is a prevalent issue that significantly impacts quality of life. LBP has a high prevalence, with estimates suggesting that around 50-60% of adults experience it at some point in their lives. Knee joint pain is also a significant concern, particularly in older populations, with studies reporting prevalence rates of approximately 20-30% in individuals over 50 years old. Both conditions often co-occur, as people with LBP may also experience knee pain and vice versa [1,2]. *Viddha-agnikarma*, which combines traditional Ayurvedic treatments, involves *Viddhakarma* and Agnikarma performed using thermal cautery to stimulate specific points, potentially providing pain relief and promoting healing [3,4].

Previous research has demonstrated the potential of *Viddha-agnikarma* in alleviating musculoskeletal pain. Despite promising results, limited studies focus specifically on the comparative effectiveness of *Viddha-agnikarma* in managing lower back and knee pain. Furthermore, there is a lack of standardised protocols in existing research [5].

This study addresses the research gap by evaluating the efficacy of *Viddha-agnikarma*, focusing on pain relief as measured by the VAS. The novelty lies in its emphasis on comparing results for lower back versus knee pain and providing a foundation for future larger-scale studies. The present study aimed to assess the efficacy of *Viddha-agnikarma* in managing chronic pain associated with the lower back and knee joints in patients unresponsive to conventional therapies.

MATERIALS AND METHODS

This was a prospective intervention pilot study conducted at Department of Shalya Tantra, Mahatma Gandhi Ayurveda College, Hospital and Research Centre, Wardha, Maharashtra, India, from February 2024 to July 2024. The sample size of 12 patients was determined based on the feasibility of conducting a pilot study; ethical clearance was obtained from the Institutional Ethics Committee (Ref. No. MGACHRC/IEC/Feb-2024/793). Written informed consent was obtained from all participants prior to enrollment.

Inclusion and Exclusion criteria: The study included patients aged 18-65 years, irrespective of sex, experiencing chronic, non-radiating pain in the lower back or knee joints persisting for at least three months. Eligible participants had pain unresponsive to conventional treatments such as Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), physiotherapy, or other non-surgical pain management methods, and a baseline VAS pain score of 5 or higher. Patients with no structural deformities, fractures, or other complicating factors affecting the lower back or knee joint pain were included. Patients were excluded if they presented with acute or radiating pain, structural abnormalities, fractures, or degenerative joint diseases in the affected area. Additional exclusion criteria included a history of surgery in the lower back or knee within the past year, active infections, open wounds, or other dermatological conditions at the treatment site. Patients with neurological disorders (e.g., sciatica, spinal stenosis), systemic diseases (e.g., rheumatoid arthritis), Complex Regional Pain Syndrome (CRPS), or fibromyalgia

were also excluded. Pregnant or breastfeeding women, those on corticosteroids or immunosuppressive medications, and individuals with uncontrolled diabetes, hypertension, or cardiovascular conditions were not eligible.

Study Procedure

A total of 19 patients were screened for the study. Of these, 12 patients met the inclusion criteria and were enrolled, while seven patients were excluded based on the exclusion criteria. The symptoms and clinical findings of Groups A and B are presented in [Table/Fig-1]. Some patients were already on analgesics for pain management; these medications were discontinued, and the patients were reassessed after seven days before inclusion in the study. Throughout the intervention and follow-up period, these patients remained off analgesics. Each session, conducted every three days, was tailored to individual patient responses. The intervention aimed to reduce pain intensity, measured by the VAS ranging from 0 to 10, on day 0, 3, 7, 14, and 21, as stated in [Table/Fig-2].

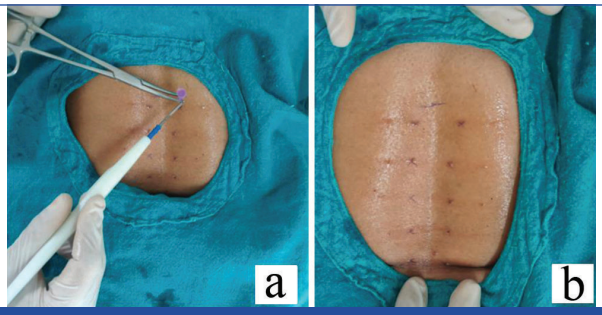
Group	Symptoms	Clinical findings
Group A: Lower Back Pain (LBP)	Chronic lower back discomfort, worsened by physical activity	Lumbar tenderness, limited forward bending, positive straight leg raise test
Group B: Knee pain	Chronic knee pain, worsened by movement, often with joint swelling	Knee joint swelling, tenderness, reduced flexibility, crepitus

[Table/Fig-1]: Symptoms and clinical finding in both groups.

Day	Intervention	Assessment
0	Initial assessment	Baseline VAS, Clinical examination
3	*Viddha-agnikarma* session 1	VAS, Follow-up examination
7	*Viddha-agnikarma* session 2	VAS, Follow-up examination
14	*Viddha-agnikarma* session 3	VAS, Follow-up examination
21	*Viddha-agnikarma* session 4	VAS, Follow-up examination

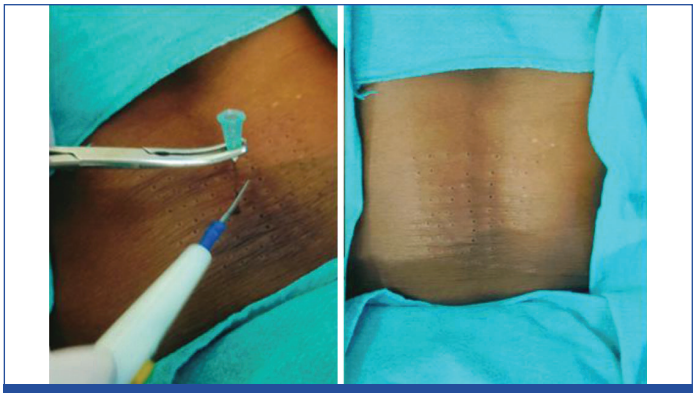
[Table/Fig-2]: Timeline for the assessment and intervention.

Therapeutic intervention: In the application of *Viddha-agnikarma*, the treatment area was first cleansed using a cotton swab soaked in an antiseptic solution. An earthing or grounding plate was positioned under the patient's thigh to prepare for the procedure. Next, sterile needles (26G, 1.5 inches in length) were inserted approximately 0.5 cm into the skin over the knee joint or lower back region at pre-marked points of maximum tenderness. A monopolar cautery device, set between 0.5 to 2 MHz, was used to administer thermal energy along each needle shaft for a duration of 2 to 5 seconds, adjusted according to the patient's tolerance and sensitivity to pain, as shown in [Table/Fig-3-5] [6].

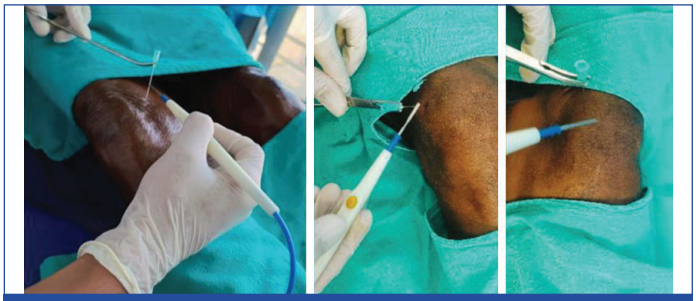


[Table/Fig-3]: a) Lower back region during *Viddha-agnikarma*; b) Scar mark after *Viddha-agnikarma*.

If the patient reported pain over a broader region rather than only at localized points, additional needle insertions were performed to address the affected areas. It's essential to note that if blood appeared after needle insertion, *Viddha-agnikarma* was discontinued at that site, and the needle was redirected to a different location. Following the complete treatment cycle, the patient was given time to rest, and the treated area was thoroughly cleaned again to ensure proper post-procedure care.



[Table/Fig-4]: *Viddha-agnikarma* at lower back region at day 14 with previous scar mark.



[Table/Fig-5]: *Viddha-agnikarma* at knee joint pain.

STATISTICAL ANALYSIS

The data were analysed by comparing the mean values of the VAS score on the day of assessment, and results were interpreted accordingly.

RESULTS

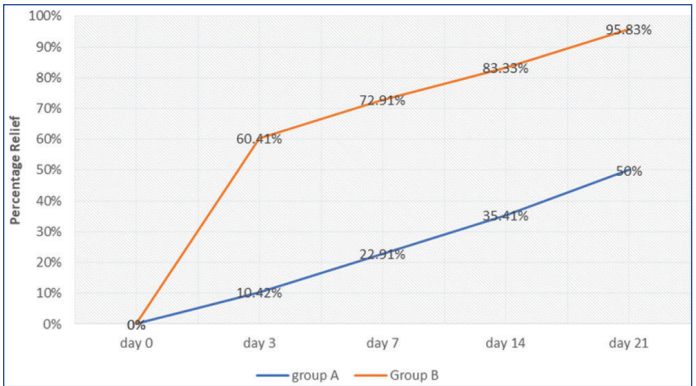
The demographic data are shown in [Table/Fig-6]. The study included 12 patients: seven male and five female, all from rural areas, with a mean age of 58±5.9 years in Group A and 54.8±8.4 years in Group B. Outcomes were tracked using VAS scores, showing marked improvement in LBP and moderate improvement in knee pain, as shown in [Table/Fig-7,8]. Patient adherence was high, and no significant adverse events were reported.

Demographic data		Group A	Group B	Total
Age (years)	18-30	0	0	0
	31-40	0	1	1
	41-50	1	0	1
	51-60	1	2	3
	61-65	4	3	7
Gender	Male	4	3	7
	Female	2	3	5
Resident	Urban	0	0	0
	Rural	6	6	12

[Table/Fig-6]: Demographic data distribution groupwise.

Group	Day	Mean±Standard Deviation	Percentage relief
Knee joint pain	Day 0	8±1.2909	0%
	Day 3	7.166±1.2133	10.42%
	Day 7	6.166±1.3437	22.91%
	Day 14	5.166±1.4624	35.41%
	Day 21	4±1.6329	50%
Lower Back Pain (LBP)	Day 0	8±1.2909	0%
	Day 3	3.166±1.067	60.41%
	Day 7	2.166±0.687	72.91%
	Day 14	1.33±0.471	83.33%
	Day 21	0.33±0.471	95.83%

[Table/Fig-7]: Pain score data for 12 patients (6 per group).



[Table/Fig-8]: Graphical representation of reduction of the pain score percentage in both the groups of patients.

DISCUSSION

The results of this study indicate that *Viddha-agnikarma* is a potentially effective treatment for pain management in patients suffering from lower back and knee joint pain. The observed reduction in VAS scores across all patient groups signifies a notable decrease in pain levels, suggesting that *Viddha-agnikarma* could be an effective alternative to conventional pain management therapies.

The study on *Viddha-agnikarma* for LBP and knee joint pain aligns with findings from various published articles, demonstrating its effectiveness in pain relief and functional improvement. Compared to a single case study on Gridhrasi [6], where pain scores reduced from 3 to 0 and stiffness from 4 to 0 over 21 days, our study also showed progressive pain reduction, supporting its efficacy in managing radiating pain. The study on Agnikarma for knee osteoarthritis (OA) [7] found that Loha Shalaka provided 83.77% pain relief, while Rajata Shalaka achieved 76.31% relief. Although our study did not compare different Shalaka types, repeated *Viddha-agnikarma* sessions significantly reduced pain and stiffness, similar to these findings.

A broader review [8] covering multiple studies on Agnikarma reinforced its long-term efficacy, with one study reporting 100% symptom relief, while another found that Loha Shalaka was superior to Rajata Shalaka for pain reduction. The case report [9], where Agnikarma and *Viddhakarma* were performed weekly for six weeks, showed VAS pain reduction from 7 to 0, complete resolution of stiffness (graded 2), crepitus (graded 1), and oedema (graded 1), mirroring the rapid and significant symptom relief seen in our study. An open randomized trial [10] comparing Agnikarma and Siravedha in Gridhrasi patients found that Agnikarma resulted in 68.42% marked improvement and 21.05% complete relief, while Siravedha showed 72.73% moderate improvement and 27.27% marked improvement, further supporting the efficacy of thermal cauterization techniques. Overall, *Viddha-agnikarma* proves to be a safe, effective, and easily implementable therapy, achieving substantial pain relief comparable to standalone Agnikarma and potentially enhanced effects through combined therapy.

When aggravated Vata accumulates in the fibrous tissues (Snayu) of the lower back joints or knee joints, it is referred to as Snayugata Vata of the particular Sandhi. The treatment approach for this condition includes therapies such as Snehan (oleation), Upanaha (poultice), Agnikarma (thermal cauterization), and Bandana (bandaging). Among these, Agnikarma is particularly effective in providing immediate pain relief. *Viddhakarma* is also beneficial in removing the aggravated Vata from the affected area. The combination of Agnikarma and *Viddhakarma* proves to be highly effective in balancing the disturbed Vata and Kapha doshas [11,12].

Mechanism of Action [13-19]

The effectiveness of *Viddhagni* in alleviating pain can be attributed to several physiological and biochemical mechanisms:

1. **Thermal stimulation and vasodilation:** *Viddhagni* involves the application of heat to specific body points, which induces vasodilation-an expansion of blood vessels. This process increases blood flow to the affected area, enhancing the delivery of oxygen and nutrients while facilitating the removal of metabolic waste products. The increased circulation helps reduce muscle stiffness and spasms, promoting relaxation and pain relief.
2. **Neural modulation:** *Viddhagni* may impact nerve pathways by stimulating sensory nerve fibers, potentially triggering the gate control mechanism. This theory suggests that non-painful stimuli can close "gates" to painful inputs, preventing pain signals from reaching the central nervous system. By activating this mechanism, *Viddhagni* could reduce pain perception.
3. **Endorphin release:** The controlled heat and minor tissue stimulation from *Viddhagni* may encourage the release of endorphins, which are natural opioids produced by the body. These endorphins bind to opioid receptors in the brain, decreasing pain perception and inducing a sense of well-being, which adds to the relief experienced by patients.
4. **Anti-inflammatory effects:** Inflammation is often a key factor in pain related to musculoskeletal issues. The thermal effect of *Viddhagni* may help lower inflammation by promoting anti-inflammatory cytokine release and reducing pro-inflammatory mediators. This decrease in inflammation can help relieve pain and enhance joint movement.
5. **Enhanced tissue repair and regeneration:** Localized heat application may activate cellular repair processes, increasing fibroblast activity and other cell functions involved in tissue healing. This promotes the repair of damaged tissues, aiding in pain relief and improving functional outcomes.

Viddhagni Karma is applied to manage pain and enhance function across various conditions, including calcaneal spur, frozen shoulder, knee osteoarthritis (OA), sciatica, and other musculoskeletal disorders. Treatment of calcaneal spur with *Viddhagnikarma* has shown notable pain relief without adverse effects. In a study with 15 participants, this therapy proved to be safe, convenient, and effective, particularly for individuals unresponsive to conventional treatments for calcaneal spur. These findings align with current research, as comparable improvements in pain management have been consistently observed [20].

Frozen shoulder (*Avabahuka*), characterized by pain, stiffness, and limited shoulder mobility, has also shown improvement with *Viddhagni Karma*. In a case study, a patient undergoing *Viddhagni Karma* for three weeks reported significant gains in mobility and pain relief. This approach was both effective and affordable, providing a practical alternative to expensive surgeries or extended medication regimens, which may carry side effects [21]. The effectiveness of *Viddhagni Karma* for frozen shoulder aligns with the positive outcomes observed in this study for various other musculoskeletal conditions.

Several studies on knee osteoarthritis (OA) further underscore the therapeutic potential of *Viddhagni Karma*. Patients with moderate to severe knee OA experienced pain relief of up to 65% after multiple therapy sessions. The improvements, measured using the Western Ontario and McMaster Universities Osteoarthritis Index.(WOMAC), were sustained for several weeks post-treatment [4,22]. The results of these studies reinforce the value of non-drug Ayurvedic interventions, supporting the current findings in the management of chronic pain conditions.

Sciatica, a common cause of severe LBP radiating to the lower limbs, has also been effectively treated with *Viddhagni Karma*. Studies demonstrated that both Agnikarma and Siravedha, alternative Ayurvedic therapies, provided significant relief for patients suffering from this debilitating condition. These treatments were shown to be safe, effective, and capable of offering fast pain relief, addressing the

need for non-invasive interventions in the management of chronic pain disorders like sciatica [23,24].

The application of *Agnikarma* in broader musculoskeletal disorders, including OA, sciatica, frozen shoulder, and spondylosis, has been widely recognized for its therapeutic benefits. Surveys of Ayurvedic practitioners have shown that *Agnikarma* is frequently used as a primary treatment modality for chronic pain conditions, with minimal side effects and high patient satisfaction [25,26]. These findings echo the results of the current study, further validating the clinical efficacy of thermal therapies such as *Viddhagni Karma* in pain management and functional recovery for a range of musculoskeletal disorders.

Conventional approaches for chronic pain management, including physical therapy, medication, and surgical procedures, often involve notable side effects or limitations, such as dependency or long-term health issues with prolonged medication use. In contrast, *Viddhagni*, as a non-pharmacological intervention, offers a potentially safer alternative with minimal side effects.

Patients in this study not only reported significant pain reduction but also noted improvements in functional mobility. These enhancements suggest that *Viddhagni* may elevate quality of life by supporting better physical function and lowering pain-related disability, which is essential for daily activities and overall well-being. Patients generally reported a positive experience with *Viddha-agnikarma*, noting improvements in their quality of life and reduced reliance on pain medications. Many expressed a willingness to continue this therapy for sustained pain relief.

Limitation(s)

Despite promising results, the study has limitations. The relatively small sample size and absence of a control group restrict the ability to definitively attribute observed benefits to *Viddhagni* alone. Future research should focus on larger randomized controlled trials to confirm these results and build stronger evidence for its efficacy. Additionally, studying the long-term effects and potential adverse outcomes of *Viddhagni* is important for broader clinical application.

CONCLUSION(S)

The findings of this study indicate that *Viddha-agnikarma* is an effective therapy for managing lower back and knee joint pain, demonstrating significant reductions in VAS scores over 21 days. LBP exhibited rapid improvement, with 95.83% pain relief by the end of the study, whereas knee joint pain showed a progressive but comparatively moderate improvement of 50%. The mechanism of action involves thermal stimulation, vasodilation, neural modulation, endorphin release, and anti-inflammatory effects, which contribute to pain relief and enhanced tissue repair. Compared to conventional pain management approaches, *Viddha-agnikarma* offers a non-pharmacological, minimally invasive alternative with high patient adherence and no reported adverse effects. While the results are promising, larger controlled studies are needed to further validate its long-term efficacy and establish it as a mainstream therapeutic option.

REFERENCES

[1] Hoy D, Brooks P, Blyth F, Buchbinder R. The Epidemiology of low back pain. Best Pract Res Clin Rheumatol. 2010;24(6):769-81. Doi: 10.1016/j.berh.2010.10.002. PMID: 21665125.
[2] Iijima H, Suzuki Y, Aoyama T, Takahashi M. Interaction between low back pain and knee pain contributes to disability level in individuals with knee osteoarthritis: A cross-sectional study. Osteoarthritis Cartilage. 2018;26(10):1319-25.
[3] Ghune BB, Gadve BN. A conceptual study of Agnikarm in ayurveda: A review article. J Pharmacogn Phytochem. 2024;13(1):380-83.
[4] Wetal VR, Gupta A. Analgesic effect of viddha, a nonpharmacological, cost effective local therapy of ayurveda (An Indian System of Medicine) in knee Osteoarthritis (OA): A case report. Int J Clin Exp Med Sci. 2018;4(3):35-38.
[5] Rathod K, Kumar N, Dudhamal TS. Management of Janusandhigata Vata wsr to osteoarthritis of knee joint with modified method of agnikarma by the use of electrocautery-a case report. Int J AYUSH Case Rep. 2022;6(3):318-24.
[6] Meghana RM. A clinical case study to evaluate the efficacy of Viddha Agni Karma in Gridhrasi WSR to sciatica syndrome. Futur Trends Med Sci. Book 16, IIP Series. 2024;3:21-31, e-ISBN: 978-93-6252-063-03.
[7] Jethava NG, Dudhamal TS, Gupta SK. Role of Agnikarma in Sandhigata Vata (osteoarthritis of knee joint). AYU. 2015;36(1):23-28.
[8] Dudhamal T. Ayurveda research on agnikarma in osteoarthritis of knee joint. Arthroplasty-Advanced Techniques and Future Perspectives. 2022:201:108968.
[9] More DK, Sonekar R, Bhojane R, Shelke A. Effect of Agnikarma and Viddhakarm in the management of pain and stiffness in Gridhrasi W.S.R. to sciatica- a case study. World J Pharm Res. 2024;13(20):524-32.
[10] Vaneet Kumar J, Dudhamal TS, Gupta SK, Mahanta V. A comparative clinical study of Siravedha and Agnikarma in management of Gridhrasi (sciatica). AYU. 2014;35(3):270-76.
[11] Sharma P, Sharma A. Sushrut Samhita. Varanasi: Chaukhamba Surbharati Prakashan; 2017. Sharirsthan, Siravyadhavidhiadhyaya, Chapter 8, Shloka 22, p.115.
[12] Sharma P, Sharma A. Sushrut Samhita. Varanasi: Chaukhamba Surbharati Prakashan; 2017. Sutrasthan, Agnikarmavidhiadhyaya, Chapter 12, Shloka 4, p.85.
[13] Gogate RB. Viddha ani Agnikarma Chikitsa. Pune: Vaidyamitra Prakashana; 2006.
[14] An introduction to pain pathways and mechanisms. Available from: https://www.ucl.ac.uk/anaesthesia/sites/anaesthesia/files/PainPathwaysIntroduction.pdf. [Cited 2025 Mar 05].
[15] Pain. Available from: https://en.wikipedia.org/wiki/Pain. [cited 2025 Mar 05].
[16] Dafny N. Chapter 8: Pain Modulation and Mechanisms. Neuroscience Online. Available from: http://nba.uth.tmc.edu/neuroscience/s2/chapter08.html [cited 2025 Mar 05].
[17] Physiology of Pain. Available from: http://www.health24.com/Medical/Pain-Management/About-pain/Physiology-of-pain-20120721. [cited 2025 Mar 05].
[18] G protein-coupled receptor Available from: https://en.wikipedia.org/wiki/G_protein%E2%80%93coupled_receptor. [cited 2025 Mar 05].
[19] Vigotsky AD, Bruhns RP. The role of descending modulation in manual therapy and its analgesic implications: A narrative review. Pain Res Treat. 2015;2015:292805.
[20] Sabade PP, Parvatkar JS. The clinical study of the efficacy of viddhagni karma in the pain management of calcaneal spur. World J Pharm Res. 2019;8:1874-81.
[21] Godase JB, Sonekar R, Sonekar A, Role of Viddhakarma in avabahuka (Frozen Shoulder)-a case study. World J Pharm Res. 2024;13(5):1393-400.
[22] Shukla J, Choudhari VM. Siravedha, A cost effective, nonmedicinal local therapy of Ayurveda in Janu Sandhigata Vata (Knee joint Osteoarthritis)-A case study. J Emerging Technol Innov Res. 2024;11(5):408-11.
[23] Kabra AB, Chopde SS. Effect of Viddhakarma In Grudhrasi (Sciatica)–A case study. World J Pharm Res. 2024;13(7):709-13.
[24] Kumar JV, Dudhamal TS, Gupta SK, Mahanta V. A comparative clinical study of Siravedha and Agnikarma in management of Gridhrasi (sciatica). AYU. 2014;35(3):270-76.
[25] Shetye PP, Borase YS, Pawar AD, Khatu PP. Clinical study of efficacy of agnikarma in pain manage-ment of Avabahuk by using Tamra Shalaka. Clinical study. Int J Res Ayurveda Med Sci. 2020;3(3):159-64.
[26] Sharma A, Siddalingaiah SH. Agnikarma (Cautery) practices-a survey study. J Res Tradit Med. 2022;7(1):01-07.

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