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Upanaha Swedana in Ayurveda: Classical Insights, Clinical Evidence, and Modern Correlations

Kailash Tada[1*], Gyan Prakash Sharma[2], Vaidya Sadhana Dadhich[3], Jitendra Pal[4]

[1*]PG Scholar, Department of *Panchakarma* at Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur.
[2]H.O.D. & Professor, Department of *Panchakarma* at Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur
[3]PG Scholar, Department of *Panchakarma* at Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur.
[4]PG Scholar, Department of *Panchakarma* at Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur

Abstract
Upanaha Swedana, a classical Ayurvedic poultice fomentation therapy, has been widely used in the management of *Vata Vyadhis*, particularly *Sandhigata Vata* (osteoarthritis). This review consolidates data from classical Ayurvedic texts [1–6], published clinical trials [7–11], case studies [12–14], and modern reviews [15–18]. Major formulations such as *Koladi, Kolakulathadi, Kottamchukkadi, Godhumadi, Shatapushpadi,* and *Salavana* are described along with their pharmacological rationale. Clinical evidence demonstrates consistent relief in pain, stiffness, and swelling [7–14]. Mechanisms are interpreted through Ayurvedic principles (*ushna, snigdha, guru, sthira gunas*) [1–3] and modern correlates (thermotherapy, phytochemistry, compression, neuromodulation) [15–18].

Keywords: *Upanaha Sweda; Koladi Upanaha; Kolakulathadi Upanaha; Sandhigata Vata*; Osteoarthritis; Bandaging in Ayurveda.

1. Introduction

Osteoarthritis (OA) is the most prevalent chronic joint disorder worldwide, affecting over 500 million people [15]. It is a major cause of disability in older adults, with prevalence increasing due to aging, obesity, and sedentary lifestyles. In India, 22–39% of adults over 50 years have symptomatic OA, with women being more affected [15]. OA leads to chronic pain, restricted mobility, reduced independence, and socioeconomic burden.

In Ayurveda, OA is understood as *Sandhigata Vata* [1–3]. Classical texts describe it with features such as *Sandhishoola* (joint pain), *Sandhishotha* (swelling), *Sandhigraha* (restricted movement), *Sandhishabda* (crepitus), and *Vata purna driti sparsha* (feeling of emptiness in joint cavity) [1,2]. Pathogenesis (*samprapti*) involves aggravated *vata* due to *ruksha* (dry), *sheeta* (cold), and *laghu* (light) qualities, combined with *dhatu kshaya* and *srotorodha*, leading to degeneration and pain [2,3].

Modern science correlates this with cartilage degeneration, osteophyte formation, synovial inflammation, and elevated inflammatory cytokines such as IL-1β and TNF-α [15]. Thus, *Sandhigata Vata* and OA share conceptual overlap as chronic degenerative joint disorders.

Upanaha Swedana is described in *Charaka Samhita, Sushruta Samhita,* and *Ashtanga Hridaya* as an important modality for *Vata Vyadhis* [1–3]. The word *Upanaha* comes from "*Upa*" (near) and "*Nah*" (to bind), denoting binding of medicated paste over an affected site [1]. Herbal paste prepared with pulses, cereals, oils, salts, and sour media is applied warm, covered with leaves (e.g., *Arka, Eranda*) or cloth, and bandaged. It is retained for 6–12 hours, producing sustained warmth, pressure, and herbal action [1,2].

Upanaha works through **Ayurvedic rationale**—opposing qualities of aggravated *vata* with *ushna* (heat), snigdha (unctuousness), *guru* (heaviness), and *sthira* (stability) [1–3]—and through **modern physiological pathways** including thermotherapy-induced vasodilation, transdermal absorption, mechanical compression, and neuromodulation [15–18].

Clinical studies consistently report improvement in pain, stiffness, swelling, and functional mobility with *Upanaha* in osteoarthritis and related disorders [7–14]. This review synthesizes classical theory, formulations, mechanisms, and clinical evidence, with emphasis on *Koladi Upanaha* for *Sandhigata Vata.*

2. Conceptual Basis of *Upanaha Swedana*

Etymology and Definition

The word *Upanaha* comes from the Sanskrit roots *"Upa"* (near, close) and *"Nah"* (to bind or tie). Thus, *Upanaha* literally means "to bind near" [1]. Acharyas describe it as a procedure involving application of medicated paste (*lepa*) and subsequent bandaging (*bandhana*) over the affected site [1,2]. In English, it is often equated with poultice fomentation or herbal bandaging.

Charaka Samhita lists *Upanaha* among *Niragni Sweda* (sudation without direct fire) [1]. *Sushruta Samhita* mentions it under both *Sagni Sweda* and *Niragni Sweda*, showing its flexibility [2]. *Ashtanga Hridaya* describes it as effective in disorders of pain, stiffness, and swelling due to aggravated *vata* [3].

Classification of *Upanaha*

Classical texts provide multiple bases of classification:

1. **By source of heat**
   - *Sagni Upanaha*: prepared with heating; used in *vata* disorders dominated by *sheeta guna* (cold quality) [2].
   - *Niragni Upanaha*: without heating, but using *ushna-virya* drugs (hot potency); useful when *kapha* or *ama* is associated [1].
2. **By qualities (*guna*)**
   - *Snigdha Upanaha*: uses oil, ghee, or milk; beneficial where dryness and degeneration predominate, e.g., *Sandhigata Vata* [1].
   - *Ruksha Upanaha*: prepared with *dhanyamla*, *kanji*, or *takra*; indicated where stiffness and swelling are prominent, e.g., *Amavata* [2].
3. **By form of application**
   - *Pradeha*: thick paste applied directly without bandage [1].
   - *Pinda/Potali (Sankara)*: herbal powders tied in a bolus and applied [2].
   - *Bandhana*: medicated paste applied and tied firmly with bandage [2].

Materials for Bandaging

Bandhana (binding) is an integral part of Upanaha. *Acharya Charaka* mentions *charmapatta* (animal skin) for its *ushna veerya* (hot potency) [1]. In its absence, wool (*avika shataka*), silk (*kausheya*), or *vatahara patra* (leaves of *Arka*, *Eranda*, *Nirgundi*) were advised [1,2]. These materials not only provide insulation but also contribute therapeutic properties. This corresponds to modern understanding where bandaging conserves heat, maintains drug contact, and offers mechanical support [15].

Duration (*Dharana Kala*)

Classical guidelines recommend retaining the *Upanaha* for 10–12 hours, often overnight [2]. Application in the morning is removed in the evening and vice versa. In colder seasons, it may be retained longer. In clinical practice, duration is often shortened (3–6 hours) depending on patient comfort. The sustained contact distinguishes *Upanaha* from other *Swedana* like *Nadi* or *Bashpa Sweda*, which are short-term [1].

Indications

Upanaha is indicated in a wide range of *Vata* disorders [1–3]:

- *Sandhigata Vata* (osteoarthritis).
- *Amavata* (rheumatoid arthritis), especially with *ruksha/niragni* varieties [9].
- *Katigraha* (low back stiffness), *Gridhrasi* (sciatica), *Manyastambha* (cervical spondylosis).
- *Pakshaghata* (hemiplegia), *Vishwachi* (cervical radiculopathy).
- *Shotha* (swelling), *Vrana* (wounds).

Modern reports also validate its use in plantar fasciitis (*vatakantaka*) and carpal tunnel syndrome [8,12,14].

Contraindications

Contraindications include [1–3]:

- *Pitta*-dominant conditions with burning, redness, or suppuration.
- *Pakva shotha* (mature abscess).
- Open wounds or ulcers at the application site.
- Severe varicose veins, uncontrolled diabetes, or allergic skin conditions.

Unique Therapeutic Position

What differentiates *Upanaha* from other Swedana therapies is its **sustained action**. While *Nadi Sweda* or *Pinda Sweda* deliver intense but short-duration heat, *Upanaha* provides prolonged mild heat and continuous drug action [2]. This makes it more suitable for chronic degenerative conditions like OA, where sustained relief is required.

Bandhana (binding) also adds a rehabilitative element. By stabilizing the joint, it reduces microtrauma, prevents strain, and provides comfort—similar to modern braces [15].

Conceptual Integration

Ayurveda emphasizes the principle of *samanya vishesh siddhanta*—like increases like, and opposites balance. *Vata*, being *sheeta, ruksha, laghu, chala*, is pacified by the opposites: *ushna, snigdha, guru, sthira*. *Upanaha* embodies this principle [1–3].

In modern parallels, *Upanaha* combines [15–18]:

- Thermotherapy (vasodilation, circulation).
- Topical drug delivery (herbal anti-inflammatory, analgesic compounds).
- Compression therapy (reducing edema, providing support).
- Physiotherapy-like bracing.

Thus, *Upanaha* is not merely an ancient ritual but a scientifically plausible therapy that integrates physical, pharmacological, and mechanical principles into one modality.

3. Classical Formulations of *Upanaha Swedana*

The therapeutic richness of *Upanaha Swedana* lies in its formulations, which vary according to the doshic predominance, stage of disease, and patient constitution. Classical texts such as *Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Chakradatta,* and *Bhaishajya Ratnavali* mention multiple *yogas* (formulations) [1–6]. Each combines cereals, pulses, herbs, salts, sour media, and fats in specific

proportions to counteract aggravated *vata*. Modern studies confirm the pharmacological validity of many of these ingredients [7–11].

3.1 *Kolakulathadi Upanaha*
- **Classical Source**: *Charaka Samhita* and *Chakradatta* [1,4].
- **Ingredients**: *Kola* (Ziziphus jujuba), *Kulattha* (Dolichos biflorus), *Rasna* (Pluchea lanceolata), *Masha* (Vigna mungo), *Atasi* (Linum usitatissimum), *Tila* (Sesamum indicum), *Eranda* (Ricinus communis), *Vacha* (Acorus calamus), *Shatapushpa* (Anethum sowa).
- **Ayurvedic Properties**: *Ushna, Snigdha, Vata-Kapha hara.*
- **Indications**: *Sandhigata Vata, Amavata, Katigraha*.
- **Modern Notes**:
  - *Kulattha* is rich in phenolics, showing uric acid-lowering and anti-inflammatory effects.
  - *Atasi* (flaxseed) provides omega-3 fatty acids that protect cartilage.
  - *Rasna* contains flavonoids with proven anti-arthritic action [15].
- **Clinical Evidence**: Trials show *Kolakulathadi Upanaha* reduces pain, swelling, and stiffness in knee OA [7].

3.2 *Koladi Upanaha*
- **Source**: *Bhaishajya Ratnavali* [6].
- **Ingredients**: *Kola*, *Atasi*, *Rasna*, *Eranda moola*, *Devadaru*, *Saindhava Lavana*.
- **Ayurvedic Properties**: *Vatahara*, *vedanasthapana* (analgesic).
- **Indications**: Knee osteoarthritis, low back stiffness.
- **Modern Evidence**: Clinical studies comparing *Koladi* with *Kushtadi Upanaha* found *Koladi* more effective in reducing pain and improving ROM [7].

3.3 *Kottamchukkadi Upanaha*
- **Source**: *Ashtanga Hridaya* [3].
- **Ingredients**: *Kottam* (Saussurea lappa), *Chukku* (Zingiber officinale), *Rasna*, *Devadaru*, *Eranda*.
- **Ayurvedic Properties**: *Ushna virya, Kapha-Vatahara,* especially for *ama*-associated stiffness.
- **Indications**: OA with swelling, *Amavata*.
- **Modern Notes**: Saussurea and ginger are validated for anti-inflammatory and analgesic properties [15].

3.4 *Godhumadi Upanaha*
- **Source**: *Sushruta Samhita* [2].
- **Ingredients**: *Godhuma* (wheat), *Yava* (barley), *Tila* (sesame), *Saindhava*.
- **Ayurvedic Properties**: *Vatahara, brimhana* (nourishing).
- **Indications**: *Katigraha* (low back stiffness), *Sandhigata Vata*.
- **Clinical Evidence**: Comparative studies suggest *Godhumadi* is especially effective for stiffness and reduced mobility [9].

3.5 *Shatapushpadi Upanaha*
- **Source**: *Charaka Samhita* [1].
- **Ingredients**: *Shatapushpa*, *Rasna*, *Devadaru*, *Tila*, *Saindhava*.
- **Properties**: *Vatahara*, analgesic.
- **Indications**: Knee OA with predominant pain.
- **Clinical Evidence**: Trials comparing *Shatapushpadi* with *Godhumadi* showed faster pain relief in the *Shatapushpadi* group [9].

3.6 *Salavana Upanaha*
- **Source**: *Chakradatta* [4].
- **Ingredients**: *Saindhava lavana* in high proportion, mixed with cereals and oils.
- **Properties**: *Ushna, Tikshna, Kapha-Vatahara*.
- **Indications**: Chronic joint stiffness, *Pakshaghata*, *Kapha-vata* dominated pain.
- **Modern Notes**: Comparable to salt packs used in physiotherapy.

3.7 *Panchakola Upanaha*
- **Source**: *Bhaishajya Ratnavali* [6].
- **Ingredients**: *Pippali, Pippalimoola, Chavya, Chitraka, Nagara.*
- **Properties**: *Ushna, Teekshna, Ama-pachana.*
- **Indications**: *Amavata*, early-stage inflammatory arthritis.

3.8 *Devadarvadi Upanaha*
- **Source**: *Kashyapa Samhita* [5].
- **Ingredients**: *Devadaru, Rasna, Masha, Yava, Kushta, Kulattha, Godhuma.*
- **Properties**: *Vata-Kapha shamana, shothahara, shoolahara.*
- **Indications**: *Sandhigata Vata*, inflammatory swellings.

3.9 *Naga Mirc*ha (Bhut Jolokia) *Lepa* as *Upanaha* Variant
- **Source**: Case innovation [12].
- **Ingredients**: *Naga Mircha (Capsicum chinense), Lasuna, Nagara, Tamboola, Saindhava, Tila taila.*
- **Properties**: *Ushna, Vedanasthapana*.
- **Modern Note**: Comparable to topical capsaicin creams [15].
- **Case Evidence**: Significant pain relief in *Sandhigata Vata* reported [12].

Table 1. Classical *Upanaha* Types and Formulations

Formulation	***Ingredients***	***Dosha Action***	***Reference***	***Indications***
Kolakulathadi Upanaha	*Kola, Kulattha, Rasna, Masha, Atasi, Tila, Eranda, Vacha, Shatapushpa*	*Vata-Kapha Hara*	*Charaka, Chakradatta* [1,4]	*Sandhigata Vata, Amavata*
Koladi Upanaha	*Kola, Atasi, Rasna, Eranda moola, Devadaru, Saindhava*	*Vatahara*	*Bhaishajya Ratnavali* [6]	OA knee, *Katigraha*
Kottamchukkadi Upanaha	*Kottam, Chukku, Rasna, Devadaru, Eranda*	*Kapha-Vatahara*	*Ashtanga Hridaya* [3]	*Sandhigata Vata, Amavata*
Godhumadi Upanaha	*Godhuma, Yava, Tila, Saindhava*	*Vatahara, Brimhana*	*Sushruta Samhita* [2]	*Katigraha,* OA knee
Shatapushpadi Upanaha	*Shatapushpa, Rasna, Devadaru, Saindhava, Tila*	*Vatahara, Analgesic*	*Charaka Samhita* [1]	*Janu Sandhigata Vata*
Salavana Upanaha	*Lavana (salt-rich), pulses, oils*	*Vata-Kaphahara*	*Chakradatta* [4]	Chronic stiffness, *Kapha-Vata* joints
Panchakola Upanaha	*Pippali, Pippalimoola, Chavya, Chitraka, Nagara*	*Ushna, Teekshna*	*Bhaishajya Ratnavali* [6]	*Amavata, Ama*-associated disorders
Devadarvadi Upanaha	*Devadaru, Rasna, Masha, Yava, Kushta, Kulattha, Godhuma*	*Vata-Kapha shamana*	*Kashyapa Samhita* [5]	*Sandhigata Vata, swelling*
Naga Mircha Lepa	*Naga Mircha, Lasuna, Nagara, Tamboola, Saindhava, Tila Taila*	*Ushna, Vedanasthapana*	IJAPR Case Report [12]	Knee OA (innovative adaptation)

4. Therapeutic Mechanism and Modern Correlation

4.1 *Ayurvedic* Understanding

In *Ayurveda*, the action of *Upanaha Swedana* is explained through the principle of *guna samanya vishesh siddhanta*. Vata dosha, which dominates in *Sandhigata Vata*, possesses *sheeta* (cold), *ruksha* (dry), *laghu* (light), and *chala* (mobile) qualities [1–3]. These lead to symptoms such as pain, stiffness, cracking, and joint instability.

Upanaha balances these through opposite qualities:

- *Ushna guna* (heat) → counteracts *sheeta* [1].
- *Snigdha guna* (unctuousness from oils/ghee) → relieves *ruksha* [2].
- *Guru guna* (heaviness from cereals/pulses) → balances *laghu* [1,2].
- *Sthira guna* (stability from *bandhana*/binding) → neutralizes *chala* [3].

Thus, *upanaha* is specifically designed to pacify aggravated *vata* locally.

Additionally, *Ayurveda* describes *srotoshodhana* (clearing of channels) as a key effect. The warmth and paste soften accumulated doshas, dilate channels, and allow free circulation of *vata*, leading to pain relief and improved movement [1].

4.2 Biomedical Correlates

From a modern perspective, *Upanaha Swedana* acts through four key mechanisms [15–18]:

a) Thermal Therapy (Heat Transfer and Vasodilation)

When paste is warmed (*Sagni Upanaha*) or retains heat via bandaging, local temperature rises, producing:

- **Vasodilation** of superficial blood vessels.
- **Increased perfusion**, oxygen, and nutrient delivery.
- **Washout of inflammatory mediators** like prostaglandins and bradykinin. This aligns with modern thermotherapy used in OA management [15].

b) Transdermal Drug Delivery

Herbal paste contains oils (*tila, eranda*), sour media (*takra, kanji*), and salt (*saindhava*). These enhance skin permeability [7,9].

- *Sesamum indicum* oil is a natural penetration enhancer.
- *Saindhava lavana* draws moisture, improving diffusion.
- *Dhanyamla* lowers pH, facilitating ionization of phytochemicals.

Herbs like *Rasna* (Pluchea lanceolata) contain flavonoids with anti-arthritic action [15]. *Atasi* (flaxseed) provides omega-3 fatty acids. *Eranda* root offers analgesic effects. *Capsicum* (Naga Mircha)

contains capsaicin, which desensitizes nociceptors [12].

c) Mechanical Compression and Immobilization
Bandaging exerts mild compression, reducing edema by limiting interstitial fluid accumulation [15]. It also immobilizes the joint, preventing microtrauma, similar to orthopedic braces. This explains why patients often report a sense of support and stability after *Upanaha*.

d) Neuromodulation and Pain Relief
Heat and compression stimulate cutaneous thermoreceptors and mechanoreceptors. According to the gate control theory, this inhibits nociceptive transmission to higher centers [15]. Warmth may also increase endorphin release, enhancing analgesia.

4.3 Phytochemistry of Key Ingredients

- ***Rasna* (Pluchea lanceolata)**: contains flavonoids and sesquiterpene lactones with anti-inflammatory and analgesic effects [15].
- ***Kulattha* (Dolichos biflorus)**: phenolics and proteins with anti-inflammatory, uricosuric activity.
- ***Atasi* (Linum usitatissimum)**: omega-3 fatty acids with cartilage-protective effect.
- ***Eranda* (Ricinus communis)**: ricinoleic acid with analgesic and counter-irritant effect.
- ***Saindhava Lavana***: hygroscopic, increases local circulation and reduces stiffness.
- ***Naga Mircha* (Capsicum chinense)**: capsaicin desensitizes TRPV1 nociceptors, reducing chronic pain [12].

Thus, classical combinations can be interpreted as polyherbal topical formulations with synergistic phytochemistry.

4.4 Clinical Mechanistic Observations

Clinical trials show consistent outcomes:

- Reduction in pain (VAS).
- Decreased stiffness and swelling.
- Improved ROM and WOMAC scores in knee OA [7–9].
- In a comparative study, *Kolakulathadi Upanaha* reduced crepitus and pain more effectively than *Kottamchukkadi* [7].
- *Koladi Upanaha* proved superior to *Kushtadi* in reducing pain intensity [7].
- *Naga Mircha Lepa* provided pain relief comparable to topical capsaicin formulations [12].

These outcomes can be explained via combined thermal, pharmacological, mechanical, and neuromodulatory pathways [15–18].

4.5 Comparison with Modern Therapies

Modern Modality	Mechanism	Comparison with *Upanaha*
Hot packs / paraffin wax	Thermotherapy	Similar heat; *Upanaha* adds herbal pharmacology [15].
NSAID gels (diclofenac, capsaicin)	Local analgesia/anti-inflammatory	Comparable; *Upanaha* provides multi-drug synergy [15].
Knee braces / supports	Immobilization and load sharing	*Bandhana* provides similar mechanical support [15].
Physiotherapy (TENS, ultrasound)	Neuromodulation, circulation	*Upanaha* provides similar through warmth and binding [15].

4.6 Safety Considerations

Upanaha is considered safe when performed correctly [1–3]. Reported adverse events are minimal [7–14]:

- Mild erythema or itching if paste is too hot.
- Skin irritation in sensitive patients.
- Rare allergic reactions.

These can be avoided with skin testing, proper temperature control, and fresh paste preparation. Compared to long-term NSAID use, which risks gastritis or renal toxicity, *Upanaha* is extremely safe [15].

4.7 Emerging Insights

Research in thermal therapy shows that localized heating induces **heat shock proteins (HSPs)**, which protect chondrocytes and reduce oxidative stress [15]. Herbal penetration may also modulate inflammatory cytokines like TNF-α and IL-6 [15]. Thus, *Upanaha* may have potential as a disease-modifying intervention, not just symptomatic therapy.

Summary of Mechanism

- ***Ayurvedic***: *vata* pacification via *ushna, snigdha, guru, sthira; srotoshodhana.*
- **Modern**: thermotherapy, phytochemical delivery, compression, neuromodulation.

Together, these explain its consistent success in OA and related disorders [7–14,15–18].

5. Clinical Evidence on *Upanaha Swedana*

The clinical evidence for *Upanaha Swedana* spans randomized trials, comparative studies, case reports, and conceptual reviews. While study sizes are generally small, outcomes are consistently favorable in terms of pain relief, stiffness reduction, swelling control, and improved joint mobility.

5.1 Comparative Clinical Trials

Several comparative studies have evaluated the efficacy of different *Upanaha* formulations:

- ***Kolakulathadi* vs*. Kottamchukkadi Upanaha***: In *Janu Sandhigata Vata* (knee OA), both were effective, but *Kolakulathadi* showed slightly better results for pain and crepitus [7].
- ***Shatapushpadi* vs*. Godhumadi Upanaha***: Both reduced pain and stiffness, but *Shatapushpadi* provided faster analgesia, while *Godhumadi* worked better for stiffness [9].
- ***Koladi* vs*. Kushtadi Upanaha***: A clinical study found *Koladi* more effective in reducing pain intensity and improving range of motion compared to *Kushtadi* [7].
- ***Kolakulathadi Upanaha* vs*. Eranda Taila Pana* in *Vatakantaka* (Plantar Fasciitis)**: *Kolakulathadi* produced significantly greater relief in pain and stiffness than oral castor oil therapy [8].

These comparative trials highlight that while many *Upanaha* formulations are effective, *Koladi* and *Kolakulathadi* consistently emerge as superior options in osteoarthritis.

5.2 Case Studies and Observational Reports

Individual case reports add narrative richness and demonstrate *Upanaha's* adaptability:

- ***Naga Mircha* (Bhut Jolokia) *Lepa***: Used innovatively as an *Upanaha* in a middle-aged woman with knee OA, producing marked pain relief and improved mobility after 10 sessions [12].
- **Carpal Tunnel Syndrome**: *Ayurvedic* management with therapies including *Kolakulathadi churna pinda swedana* showed ~59% symptom improvement and better nerve conduction velocities [14].
- ***Sandhigata Vata* with *Janudhara* and *Panchatikta Ksheera Basti***: Though not *Upanaha* alone, the case underscores the importance of combining local fomentation with systemic therapy [13].

5.3 Clinical Reviews and Conceptual Articles

Several reviews and conceptual analyses provide broader perspectives:

- ***Upanaha Sweda* Therapy in Ayurveda**: Emphasizes its effectiveness in joint disorders, linking classical rationale to modern physiotherapy [9].
- **Multidimensional Applications of *Upanaha Sweda***: Extends its role to neurological stiffness, wound healing, and anorectal disorders [10].
- ***Upanaha Swadana* with Special Reference to Bandaging**: Discusses materials, methods, and compares *bandhana* to orthopedic compression techniques [11].

These highlight that *Upanaha* is not only limited to osteoarthritis but has versatile applications.

5.4 Outcomes Reported

Across clinical studies [7–11,12–14]:

- **Pain reduction**: 50–80% improvement in VAS scores.
- **Stiffness relief**: Significant improvement in ROM and WOMAC sub-scores.
- **Swelling reduction**: Documented in both OA and inflammatory cases.
- **Functionality**: Improved walking distance, stair climbing, and daily activities.
- **Patient satisfaction**: High compliance and acceptability.

5.5 Safety Profile in Clinical Studies

Adverse events were minimal [7–14]:

- Rare mild erythema or itching.
- Occasional skin sensitivity to heat.
- No systemic adverse events reported.

This confirms *Upanaha's* safety compared to NSAIDs or intra-articular steroids.

5.6 Limitations of Current Evidence

Despite positive results, limitations include:

- Small sample sizes (20–60 patients).
- Lack of blinding or placebo control.
- Short follow-up (2–4 weeks).
- Heterogeneous formulations and methods.

Still, reproducibility across settings lends credibility.

Table 2. Summary of Clinical Studies on Upanaha Sweda

Author/Year	Condition	Sample Size	Intervention	Comparator	Key Outcomes
Bagalwadi et al., 2019 [7]	*Janu Sandhigata Vata* (OA knee)	40	*Koladi* vs *Kushtadi Upanaha*	Comparative	*Koladi* showed superior pain & ROM outcomes
Kolakulathadi vs Kottamchukkadi, 2018 [7]	OA knee	60	*Kolakulathadi Upanaha*	*Kottamchukkadi*	Both effective; *Kolakulathadi* marginally better
Shatapushpadi vs Godhumadi, 2019 [9]	OA knee	40	*Shatapushpadi Upanaha*	*Godhumadi Upanaha*	Faster pain relief in *Shatapushpadi*; stiffness relief in both
Chandel et al., 2024 [8]	Plantar Fasciitis (*Vatakantaka*)	40	*Kolakulathadi Upanaha*	*Eranda Taila Pana*	*Upanaha* superior in pain & stiffness relief
Imlikumba & Ringu, 2019 [12]	OA knee	Case report	*Naga Mircha Lepa (Upanaha* variant)	–	Significant pain relief, improved mobility
Gupta et al., 2023 [13]	*Sandhigata Vata* (OA knee)	Case study	*Janudhara + Panchatikta Ksheera Basti + Laksha Guggulu*	–	Pain & swelling reduced; X-ray showed maintained joint space
Bhatted et al., 2025 [14]	Carpal Tunnel Syndrome	Case study	*Kolakulathadi Churna Pinda Sweda + virechana*	–	59% symptom improvement, NCV improved

5.7 Broader Clinical Implications

Though strongest evidence supports *Upanaha* in OA (*Sandhigata Vata*), its applications extend to:

- **Neurological disorders**: supportive therapy in hemiplegia and cervical spondylosis [10].
- **Sports injuries**: sprains, strains, plantar fasciitis [8].
- **Chronic pain management**: as an affordable, safe, and culturally rooted therapy [15–18].

6. Discussion

The review of *Upanaha Swedana* reveals a therapy that embodies the strengths of Ayurveda while aligning remarkably well with modern therapeutic concepts. Evidence from classical texts [1–6], clinical studies [7–11], case reports [12–14], and integrative reviews [15–18] establishes it as a safe, effective, and accessible treatment for musculoskeletal disorders, especially *Sandhigata Vata* (osteoarthritis).

6.1 Strengths of *Upanaha* Therapy

Holistic Action

Unlike modern single-modality interventions, *Upanaha* integrates multiple therapeutic effects. It delivers warmth (thermotherapy), pharmacological action (herbal paste), compression, and immobilization in a single procedure [15]. This multi-pronged approach makes it especially effective for chronic degenerative conditions where pain, stiffness, and functional impairment coexist.

Personalization

Ayurveda emphasizes *yukti* (individualized decision-making). *Upanaha* formulations are selected based on doshic state:

- *Snigdha Upanaha* for dryness and degeneration [1].
- *Ruksha/Niragni Upanaha* for *kapha* or *ama*-associated stiffness [2].
- *Sagni Upanaha* for cold-dominant *vata* disorders [3].

This adaptability mirrors personalized medicine in modern healthcare.

Sustained Action

With *dharana kala* of 6–12 hours, *Upanaha* provides prolonged contact of medicated paste with the joint [1]. This distinguishes it from physiotherapy modalities like hot packs, which provide short bursts of heat [15]. Sustained contact allows continuous herbal action, heat retention, and stable compression.

Affordability and Accessibility

Most ingredients (sesame, horse gram, wheat, ginger, flaxseed) are inexpensive and locally available. This makes *Upanaha* especially relevant for rural and low-resource settings where modern therapies (NSAIDs, joint injections, or arthroplasty) may be unaffordable [15,16].

6.2 Alignment with Modern Science

Upanaha corresponds closely with modern therapies:

- **Thermotherapy**: Bandaged warm paste produces vasodilation and muscle relaxation, similar to hot packs [15].
- **Topical pharmacotherapy**: Herbal actives (flavonoids, omega-3s, capsaicin) penetrate transdermally, comparable to NSAID or capsaicin gels [12,15].
- **Compression/Bracing**: *Bandhana* stabilizes joints, reduces edema, akin to orthopedic supports [15].
- **Neuromodulation**: Heat and pressure stimulate mechanoreceptors, activating pain-gating pathways [15].

This integrative effect explains why *Upanaha* often produces outcomes superior to any single modern intervention [7–9].

6.3 Comparison with Other Ayurvedic Therapies

In *Vata Vyadhis*, several *Panchakarma* options exist:

- ***Basti* (medicated enema)**: systemic therapy, considered primary for *vata* disorders [1].
- ***Abhyanga* (oil massage)**: provides lubrication and circulation but lacks sustained heating.
- **Other *Swedana* (*Nadi, Pinda*)**: short-term intense heat vs. *Upanaha's* long mild heat [2].

Thus, *Upanaha* complements systemic therapies like Basti by offering local, sustained relief.

6.4 Clinical Evidence Revisited

Comparative trials demonstrate that *Upanaha* reduces pain, stiffness, and swelling significantly in OA [7–9]. *Kolakulathadi* and *Koladi* consistently emerge as superior formulations. Case reports (Naga *Mircha Lepa*, CTS management) highlight innovative adaptations [12,14]. Conceptual reviews confirm its relevance in neurological, anorectal, and wound care [10,11].

Limitations must be acknowledged: small sample sizes, lack of blinding, short follow-up, and heterogeneity in methods [7–11]. Yet, the reproducibility of benefits across contexts strongly suggests genuine therapeutic efficacy.

6.5 Safety Profile

Compared with NSAIDs or corticosteroid injections, which risk gastritis, renal toxicity, or joint infection, *Upanaha* is extremely safe [15,17]. Reported adverse events include mild skin irritation or itching if paste is too hot [7–11]. Allergic reactions are rare and preventable by patch testing. No systemic side effects are documented [12–14].

6.6 Future Research Needs

To integrate *Upanaha* into evidence-based global practice, research should focus on:

1. **Standardization**: Select 2–3 formulations (*Koladi, Kolakulathadi, Kottamchukkadi*) and define precise drug ratios, vehicles, and application protocols [7–9].
2. **Rigorous RCTs**: Conduct multicenter randomized controlled trials with large sample sizes, controls (hot packs, NSAID gels), and validated outcome measures (VAS, WOMAC, KOOS) [15–18].
3. **Biomarker and Imaging Studies**: Evaluate cytokine modulation (TNF-α, IL-6, CRP), MRI-based cartilage changes, and X-ray joint space [15].
4. **Comparative Effectiveness**: Compare *Upanaha* head-to-head with physiotherapy modalities to establish integrative positioning [16,18].
5. **Safety Studies**: Document adverse events systematically and assess patient acceptability and compliance [17].

6.7 Broader Applications

While evidence is strongest in OA, *Upanaha* has promise in:

- **Sports medicine**: sprains, plantar fasciitis [8].
- **Neurology**: hemiplegia, cervical spondylosis, *manyastambha* [10].
- **Chronic pain management**: as a culturally rooted, low-cost intervention [15,18].

6.8 Philosophical Perspective

Ayurveda values *sukha* (comfort) as much as *chikitsa* (treatment). *Upanaha* embodies this, offering warmth, stability, and reassurance. Patients often describe a sense of being cared for, reflecting the therapy's psychosomatic benefit. This dimension, often overlooked in modern medicine, highlights Ayurveda's holistic ethos [1–3].

Summary of Discussion

- *Upanaha* is a multidimensional therapy combining heat, drug delivery, compression, and immobilization [15–18].
- Clinical evidence consistently supports its role in OA and related disorders [7–14].
- It is safe, affordable, and adaptable [15,17].
- Limitations include small trials and lack of standardization [7–11].
- Future directions include robust RCTs, biomarker validation, and global integrative adoption [15–18].

7. Conclusion and Future Directions

Upanaha Swedana represents one of Ayurveda's most elegant external therapies, embodying both classical wisdom and biomedical plausibility. Rooted in the principle of balancing aggravated *vata* with opposite

qualities (*ushna, snigdha, guru, sthira*) [1–3], it has been described in authoritative texts such as *Charaka Samhita, Sushruta Samhita,* and *Ashtanga Hridaya* [1–3]. Formulations recorded in *Chakradatta, Kashyapa Samhita,* and *Bhaishajya Ratnavali* provide further evidence of its therapeutic versatility [4–6].

Clinical studies over the past two decades affirm its role in managing *Sandhigata Vata* (osteoarthritis) and other musculoskeletal disorders. Comparative trials show *Koladi, Kolakulathadi*, and *Shatapushpadi Upanaha* as effective in reducing pain, stiffness, and swelling, with outcomes often superior to standard care [7–9]. Case reports highlight its adaptability—whether in innovative forms like *Naga Mircha Lepa* [12], or in neurological contexts such as carpal tunnel syndrome [14]. Reviews confirm its multidimensional applicability, extending to wound healing, neurological stiffness, and even sports medicine [10,11,15].

Modern science explains its action through four pathways: thermotherapy-induced vasodilation, transdermal phytochemical delivery, mechanical compression, and neuromodulation [15–18]. These mechanisms mirror established physiotherapy, pharmacological, and orthopedic interventions—yet *Upanaha* uniquely integrates them in a single, low-cost, safe, and patient-friendly therapy. Importantly, its safety record is excellent, with only minor local reactions reported [7–14], making it superior to NSAIDs and corticosteroids in risk–benefit balance [15,17].

Future directions must focus on:

1. Standardizing select formulations (*Koladi, Kolakulathadi, Kottamchukkadi*) with clear protocols [7–9].
2. Conducting multicenter randomized controlled trials with validated outcome measures (VAS, WOMAC, KOOS) [15].
3. Investigating biochemical markers (CRP, TNF-α, IL-6) and imaging outcomes (X-ray, MRI cartilage thickness) [15,18].
4. Comparing *Upanaha* directly with modern physiotherapy modalities to establish integrative pathways [16].

In conclusion, *Upanaha Swedana* is more than a traditional remedy—it is a holistic, scientifically plausible, and globally relevant therapy. With further evidence from rigorous trials and standardization, it holds potential to be recognized internationally as an integrative intervention for osteoarthritis and chronic pain management.

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