RESEARCH PAPER

Evidence-Based Scientific Validation of Traditional Leech Therapy Practice *(Jalaukavacharana)*: A Case Series

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Abstract

Background

Jalaukavacharana (medicinal leech therapy) is a specialized form of *Raktamokshana* (bloodletting) described in *Ayurvedic* classics for the management of localized inflammatory, vascular, and dermatological disorders. Although this therapy has been practiced for centuries, its acceptance in contemporary healthcare requires scientific validation through clinical evidence and correlation with modern biomedical mechanisms. Recent research has identified numerous bioactive compounds in leech saliva, including hirudin, calin, eglins, and bdellins, which possess anticoagulant, anti-inflammatory, analgesic, and vasodilatory properties.

Aim

To evaluate the therapeutic effectiveness of traditional leech therapy *(Jalaukavacharana)* through clinical case observations and to correlate the observed outcomes with available scientific evidence regarding the pharmacological actions of medicinal leech saliva.

Methods

The present study combines a clinical case series with a narrative review of the literature. Eight patients suffering from diverse conditions, including rheumatoid arthritis, migraine, traumatic hematoma, osteoarthritis, venous congestion, herpes zoster, and psoriasis, were treated using *Jalaukavacharana* according to classical *Ayurvedic* principles involving *Purva Karma, Pradhana Karma*, and *Paschat Karma*. Clinical outcomes were documented through patient observations and photographic records. Relevant scientific literature was reviewed to explore the biological mechanisms and therapeutic evidence supporting medicinal leech therapy.

Results

All eight cases demonstrated favorable clinical outcomes following leech therapy. Patients reported rapid pain relief, reduction in swelling, decreased itching and burning sensations, improvement in joint mobility, and enhanced local tissue condition. Cases involving trauma and venous congestion showed noticeable reduction in edema and improvement in circulation. Patients with chronic inflammatory and dermatological disorders, including rheumatoid arthritis, herpes zoster, and psoriasis, experienced symptomatic improvement after repeated sessions. Literature findings revealed that leech saliva contains multiple bioactive substances that contribute to anticoagulant, anti-inflammatory, analgesic, and microcirculatory effects, supporting the observed clinical benefits.

Conclusion

The findings suggest that *Jalaukavacharana* is a clinically valuable therapeutic intervention for selected inflammatory, vascular, musculoskeletal, and dermatological conditions. The observed outcomes are supported by established pharmacological actions of medicinal leech saliva and by emerging clinical evidence from modern research. While the results are encouraging, larger controlled studies with standardized outcome measures are required to establish the efficacy and safety of leech therapy within evidence-based integrative healthcare frameworks.

Keywords

Jalaukavacharana, Medicinal Leech Therapy, Hirudotherapy, *Raktamokshana*, Anti-inflammatory Therapy, Pain Management, Complementary Medicine, Hirudin.

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Introduction

Leech therapy, commonly known as hirudotherapy, is one of the oldest therapeutic procedures practiced in traditional systems of medicine. The use of medicinal leeches has been documented in ancient civilizations including Egypt, Greece, Persia, and India. In Ayurveda, leech therapy is known as *Jalaukavacharana* and is classified under *Raktamokshana* (bloodletting therapy), one of the important para-surgical procedures described by Acharya *Sushruta*. *Sushruta* considered leeches as the safest method of bloodletting, particularly for delicate individuals, women, children, elderly patients, and

those with *Pitta* predominance because of their gentle mode of action and minimal tissue trauma [1, 2].

Classical *Ayurvedic* texts describe *Jalaukavacharana* as an effective treatment for disorders associated with vitiated blood (*Rakta Dushti*), inflammation (*Shotha*), pain (*Shoola*), burning sensation (*Daha*), skin diseases (*Kushtha*), abscesses (*Vidradhi*), gout (*Vatarakta*), and various localized pathological conditions [1–3]. According to *Ayurvedic* principles, the removal of vitiated blood helps restore the balance of *Doshas* and improves local tissue metabolism, thereby facilitating healing and symptom relief.

Although leech therapy experienced a decline following the advent of modern pharmacotherapy, scientific interest in hirudotherapy has re-emerged over the past few decades. This renewed attention is primarily due to the discovery of numerous biologically active substances present in leech saliva. Modern research has identified more than one hundred bioactive compounds, including hirudin, calin, destabilase, eglins, bdellins, hyaluronidase, histamine-like substances, and acetylcholine-like compounds [4, 5].

These molecules possess anticoagulant, anti-inflammatory, thrombolytic, vasodilatory, antimicrobial, and analgesic properties, providing a scientific basis for many of the therapeutic effects described in classical *Ayurvedic* literature [4–6]. The clinical application of medicinal leeches has expanded considerably in contemporary medicine. Hirudotherapy is currently recognized as an adjunctive treatment for venous congestion following reconstructive and microvascular surgery, where it improves tissue perfusion and enhances graft survival [7].

Furthermore, several clinical studies and systematic reviews have demonstrated beneficial outcomes in conditions such as osteoarthritis, rheumatoid arthritis, migraine, chronic wounds, varicose veins, psoriasis, and other inflammatory disorders [4,8–10]. The observed therapeutic effects are attributed to enhanced microcirculation, reduction of tissue edema, inhibition of inflammatory mediators, and local analgesic action. Despite its extensive traditional use and growing scientific evidence, the integration of *Jalaukavacharana* into mainstream healthcare remains limited due to a lack of standardized clinical documentation and high-quality evidence. Most available reports consist of case studies, observational trials, or small clinical investigations. Consequently, there remains a need to systematically document clinical outcomes and correlate traditional *Ayurvedic* principles with contemporary biomedical mechanisms.

The present study aims to contribute to the scientific validation of traditional leech therapy by presenting a series of clinically documented cases treated at Dr. Avinash Kande *Ayurveda Clinic* and P*anchakarma* Centre, Goa, along with a comprehensive review of contemporary scientific literature. By integrating classical *Ayurvedic* concepts with modern biomedical evidence, this study seeks to provide an evidence-based perspective on the therapeutic efficacy, safety, and clinical applicability of *Jalaukavacharana* in selected inflammatory, vascular, musculoskeletal, and dermatological conditions.

Classical *Ayurvedic* Perspective of *Jalaukavacharana*

Jalaukavacharana is a specialized form of *Raktamokshana* (bloodletting therapy) described in the *Ayurvedic* classics and is regarded as one of the most effective para-surgical procedures for the management of disorders associated with vitiated blood (*Rakta Dushti*). Acharya *Sushruta*, widely recognized as the father of surgery, devoted an entire chapter entitled *Jalaukavacharaniya Adhyaya* to the therapeutic application of leeches and emphasized their utility in patients unsuitable for more invasive bloodletting procedures.[1,2]According to *Sushruta Samhita*, *Raktamokshana* is broadly classified into *Shastra Visravana* (bloodletting using surgical instruments) and *Anushastra Visravana* (bloodletting using non-surgical methods).

Jalaukavacharana belongs to the latter category and is considered particularly suitable for individuals with *Pitta Prakriti*, children, elderly patients, women, and those with delicate constitutions because of its gentle and controlled action.[1,2] *Ayurvedic* literature classifies leeches (*Jalauka*) into two major groups: *Savisha Jalauka* (toxic leeches) and *Nirvisha Jalauka* (non-toxic leeches). Only *Nirvisha Jalauka* are recommended for therapeutic use. Six varieties of non-toxic leeches—*Kapila*, *Pingala*, *Shankhamukhi*, *Mushika*, *Pundarikamukhi*, and *Savarika*—are described in the classical texts.[1]

The indications of *Jalaukavacharana* include *Vatarakta*, *Kushtha*, *Shotha*, *Vidradhi*, *Daha*, *Pidika*, *Visarpa*, and other localized inflammatory and vascular disorders associated with vitiated *Rakta*.[1–3] The procedure is believed to eliminate *Dushta Rakta*, reduce local tissue congestion, alleviate pain (*Shoola*), swelling (*Shotha*), burning sensation (*Daha*), and itching (*Kandu*), thereby restoring physiological balance and promoting healing.[2,3] The procedure is traditionally performed in three stages: *Purva Karma* (pre-procedural preparation), *Pradhana Karma* (application of the leech), and *Paschat Karma* (post-procedural care).

During *Pradhana Karma*, the leech is applied to the affected site and allowed to feed until adequate

bloodletting is achieved. Following detachment, appropriate wound care and leech purification measures are undertaken as part of *Paschat Karma*.[1,2]From an Ayurvedic standpoint, the therapeutic efficacy of *Jalaukavacharana* is attributed to the removal of vitiated blood, reduction of aggravated *Pitta* and *Kapha Doshas*, improvement of local circulation, and restoration of tissue homeostasis. These traditional concepts show remarkable concordance with contemporary scientific findings regarding the anti-inflammatory, anticoagulant, vasodilatory, and analgesic properties of medicinal leech saliva.[4–7]

Materials and Methods

Study Design

The present study is a retrospective observational case series supplemented by a narrative review of the available scientific literature on medicinal leech therapy (*Jalaukavacharana*). The study aims to evaluate the clinical outcomes of patients treated with leech therapy and correlate these findings with contemporary scientific evidence regarding its mechanism of action and therapeutic efficacy.

Study Setting

The clinical cases included in this study were managed at Dr. Avinash Kande Ayurveda Clinic and *Panchakarma* Centre, Goa, India**.** The cases represent patients presenting with various inflammatory, vascular, musculoskeletal, and dermatological conditions for which *Jalaukavacharana* was considered an appropriate therapeutic intervention based on *Ayurvedic* principles and clinical judgment.

Patient Selection

Patients who underwent *Jalaukavacharana* and had adequate clinical documentation, including photographic records and follow-up observations, were included in the study.

Inclusion Criteria

- Patients diagnosed with localized inflammatory, vascular, musculoskeletal, or dermatological disorders.
- Patients who underwent *Jalaukavacharana* as part of their treatment protocol.
- Availability of clinical records and photographic documentation.
- Patients willing to undergo the procedure and provide informed consent.

Exclusion Criteria

- Severe anemia.
- Hemophilia or other bleeding disorders.
- Severe hypotension.
- Pregnancy.
- Active systemic infection.
- Patients receiving anticoagulant therapy.
- Incomplete clinical documentation.

Procedure of *Jalaukavacharana*

The procedure was performed according to classical Ayurvedic principles involving *Purva Karma*, *Pradhana Karma*, and *Paschat Karma*.[1–3]

Purva Karma (Pre-procedural Preparation)

The affected area was examined and cleaned prior to the procedure. Suitable medicinal leeches were selected and prepared according to standard *Ayurvedic* guidelines. Patients were assessed for contraindications before treatment.

Pradhana Karma (Main Procedure)

The medicinal leech was applied directly over the affected site. After attachment, the leech was allowed to suck blood until adequate bloodletting was achieved or spontaneous detachment occurred. In cases where necessary, the leech was gently detached following standard *Ayurvedic* procedures.

Paschat Karma (Post-procedural Care)

Following detachment, the bite site was cleaned and dressed appropriately. Patients were advised regarding local wound care and follow-up. The leeches were subsequently managed according to accepted *Ayurvedic* protocols.

Outcome Assessment

Clinical outcomes were assessed through:

- Reduction in pain.
- Reduction in swelling and edema.
- Improvement in itching and burning sensation.
- Improvement in mobility and functional status.
- Clinical examination findings.
- Serial photographic documentation.

Ethical Considerations

Written informed consent was obtained from all patients prior to treatment and for the use of clinical photographs for academic and publication purposes. Patient confidentiality was maintained throughout the study, and no identifying information has been disclosed.

Clinical Case Series

Case 1: Rheumatoid Arthritis

A 48-year-old female presented with pain, stiffness, and swelling involving the small joints of both hands. She had been diagnosed with seropositive rheumatoid arthritis and reported difficulty performing routine daily activities due to persistent joint pain and reduced mobility.

Clinical examination revealed tenderness and swelling of the interphalangeal joints. Based on the *Ayurvedic*

assessment of localized *Rakta Dushti* and inflammatory involvement, *Jalaukavacharana* was planned.Medicinal leeches were applied over the affected joints following standard *Purva Karma*, *Pradhana Karma*, and *Paschat Karma* procedures. The patient tolerated the procedure well without any complications. Following therapy, the patient reported noticeable pain relief and reduction in joint discomfort. Improvement in joint mobility and functional ability was observed during follow-up.

Figure 1: Application of *Jalaukavacharana* over an inflamed interphalangeal joint in a patient with rheumatoid arthritis. The upper panel shows pre-treatment swelling of the affected finger joint (red arrow), while the lower panel demonstrates attachment of the medicinal leech during the therapeutic procedure. Localized bloodletting was performed to reduce inflammation, pain, and tissue congestion.

Case 2: Migraine

A 35-year-old male presented with recurrent episodes of severe migraine characterized by intense unilateral headache associated with discomfort and reduced daily functioning. Clinical evaluation and routine investigations revealed no significant underlying pathology. Considering the localized nature of symptoms and the potential role of *Jalaukavacharana* in relieving pain and improving circulation, medicinal leech therapy was administered in the post-auricular region.

The procedure was carried out following standard *Ayurvedic* protocols. The patient reported marked reduction in headache intensity following the treatment. Improvement was observed immediately after the procedure, and symptomatic relief was maintained during follow-up.

Figure 2: Post-auricular application of medicinal leech therapy in a patient with migraine.

Case 3: Traumatic Hematoma Following Rubber-Bullet Injury

A 35-year-old male presented with localized pain, swelling, ecchymosis, and hematoma formation following a rubber-bullet injury. Clinical examination revealed marked tissue congestion and discoloration around the affected area, suggestive of localized blood accumulation and impaired microcirculation. Considering the presence of traumatic hematoma and local vascular congestion, *Jalaukavacharana* was planned to facilitate drainage of congested blood and promote tissue recovery. Medicinal leech therapy was performed according to standard *Ayurvedic* procedures. Following treatment, the patient reported reduction in pain and local discomfort. Clinical examination demonstrated improvement in tissue congestion, reduction in swelling, and gradual resolution of the hematoma. The procedure was well tolerated, and no adverse events were observed during follow-up.

Figure 3. Application of *Jalaukavacharana* over a localized traumatic hematoma following rubber-bullet injury. The medicinal leech was applied to the congested area to facilitate drainage of stagnant blood, improve local circulation, and reduce tissue swelling.

Case 4: Chronic Knee Osteoarthritis in a Patient with Multiple Comorbidities

A 70-year-old female presented with chronic pain, swelling, and restricted mobility of the knee joint. The patient was a known case of Type 2 Diabetes Mellitus, hypertension, and impaired renal function. She complained of difficulty in walking, joint stiffness, and persistent discomfort that significantly affected her daily activities. Clinical examination revealed swelling and tenderness around the knee joint with evidence of chronic inflammatory changes. Considering the patient's age, associated comorbidities, and localized symptoms, *Jalaukavacharana* was selected as a minimally invasive therapeutic intervention to reduce pain, inflammation, and local vascular congestion. Two medicinal leeches were applied around the affected knee joint following standard *Purva Karma*, *Pradhana Karma*, and *Paschat Karma* procedures. The therapy was well tolerated, and no procedure-related complications were observed. Following treatment, the patient reported significant reduction in knee pain and improvement in walking ability. Clinical examination demonstrated decreased swelling and improved joint comfort. The patient experienced better functional mobility during follow-up despite the presence of multiple systemic comorbidities.

Figure 4. Application of two medicinal leeches around the affected knee joint in a 70-year-old female patient with chronic osteoarthritis associated with diabetes mellitus, hypertension, and impaired renal function. *Jalaukavacharana* was performed to reduce pain, inflammation, and local tissue congestion.

Case 5: Osteoarthritic Lesion of the First Metatarsophalangeal Joint with Localized Swelling

A 65-year-old female presented with pain, swelling, and difficulty in walking involving the first metatarsophalangeal region of the foot. Radiological evaluation revealed osteophytic changes and erosive lesions involving the first metatarsal bone and proximal phalanx. The patient complained of persistent discomfort during weight-bearing activities and restriction of normal foot movements. Clinical examination demonstrated localized swelling, tenderness, and inflammatory changes around the affected joint. Based on the presence of chronic pain, local tissue congestion, and osteoarthritic changes, *Jalaukavacharana* was selected as a therapeutic intervention. Two medicinal leeches were applied around the affected metatarsophalangeal joint following standard *Ayurvedic* procedures. The treatment was performed with the objective of reducing local inflammation, improving circulation, and alleviating pain.

Following therapy, the patient reported reduction in pain and discomfort during ambulation. Clinical examination revealed a decrease in local swelling and tenderness, with improvement in functional mobility of the affected foot. No procedure-related complications were observed during follow-up.

Figure 5. Application of medicinal leech therapy around the first metatarsophalangeal joint in a 65-year-old female patient with osteophytic and erosive changes involving the first metatarsal bone and proximal phalanx. *Jalaukavacharana* was performed to reduce pain, inflammation, and localized swelling.

Case 6: Venous Congestion Following Acute Blunt Trauma

A 60-year-old female presented with severe pain and swelling of the foot following acute blunt trauma. The patient reported persistent symptoms despite treatment with modern analgesics and local therapeutic measures. Clinical examination revealed localized edema, tenderness, and discoloration suggestive of impaired venous circulation. Further evaluation with venous Doppler ultrasonography demonstrated reduced venous blood flow with evidence of venous occlusion in the affected region. Based on the presence of localized vascular congestion and persistent symptoms, *Jalaukavacharana* was planned to improve microcirculation and facilitate drainage of stagnant blood. Medicinal leech therapy was administered over the affected area following standard *Ayurvedic* procedures. The patient tolerated the procedure well without any immediate complications. Following treatment, the patient reported marked reduction in pain and local discomfort. Clinical examination demonstrated improvement in edema and tissue congestion. The affected area showed progressive recovery with improved local circulation during follow-up.

Figure 6. Application of medicinal leech therapy in a 60-year-old female patient with venous congestion following acute blunt trauma. Venous Doppler examination revealed reduced venous blood flow with occlusion. *Jalaukavacharana* was performed to relieve vascular congestion, improve microcirculation, and reduce pain and swelling.

Case 7: Herpes Zoster

A 55-year-old male presented with herpes zoster involving the upper back region. The patient complained of severe burning pain, restlessness, discomfort, and multiple vesicular skin lesions distributed along the affected dermatome. The symptoms significantly affected daily activities and quality of life. Clinical examination revealed erythematous vesicular eruptions associated with localized inflammation and tenderness. Considering the severity of burning sensation (*Daha*), pain (*Shoola*), and skin involvement, *Jalaukavacharana* was selected as a therapeutic intervention. Medicinal leech therapy was administered over the affected area following standard Ayurvedic procedures.

Multiple treatment sessions were performed according to the patient's clinical response and disease progression. The patient experienced immediate relief from burning sensation and local discomfort following therapy. Progressive reduction in itching, pain, and inflammatory skin lesions was observed during subsequent follow-up visits. Repeated treatments over a one-year period resulted in substantial clinical improvement with resolution of active lesions and marked reduction in residual skin changes. No evidence of post-herpetic neuralgia was observed during follow-up.

Figure 7. Application of medicinal leech therapy in a 55-year-old male patient with herpes zoster involving the upper back. Repeated sessions of *Jalaukavacharana* resulted in reduction of burning pain, skin lesions, and associated discomfort.

Figure 8. Follow-up image after repeated *Jalaukavacharana* sessions over a one-year period demonstrating significant clinical improvement and healing of herpes zoster lesions.

Case 8: Chronic Scalp Psoriasis

A 70-year-old female presented with chronic scalp psoriasis associated with persistent itching, scaling, plaque formation, and recurrent exacerbations. The condition had been present for several years and was causing considerable discomfort and impairment in quality of life.

Clinical examination revealed characteristic psoriatic plaques with scaling and localized inflammatory changes involving the scalp. Based on the chronic inflammatory nature of the disease and the Ayurvedic understanding of *Rakta Dushti* and *Kushtha*, *Jalaukavacharana* was selected as a therapeutic intervention.

Medicinal leech therapy was administered over the affected scalp region following standard *Ayurvedic* procedures. Appropriate precautions were taken during application due to the anatomical location and hair-bearing nature of the treatment area.

Following treatment, the patient reported reduction in itching (*Kandu*) and scalp irritation. Progressive improvement in scaling, plaque thickness, and overall

scalp condition was observed during follow-up. The procedure was well tolerated, and no treatment-related adverse effects were reported.

Figure 9. Application of medicinal leech therapy in a 70-year-old female patient with chronic scalp psoriasis. *Jalaukavacharana* was performed over the affected scalp region to reduce inflammation, itching, and psoriatic plaque activity.

Results

A total of eight patients with diverse inflammatory, vascular, musculoskeletal, and dermatological disorders underwent *Jalaukavacharana* at Dr. Avinash Kande Ayurveda Clinic and *Panchakarma* Centre, Goa. The study population consisted of five females and three males, with ages ranging from 35 to 70 years.

Table 1. Demographic and Clinical Characteristics of Patients

Case	Age/Sex	Diagnosis
1	48/F	Rheumatoid Arthritis
2	35/M	Migraine
3	35/M	Traumatic Hematoma Following Rubber-Bullet Injury
4	70/F	Chronic Arthritis with Diabetes and Hypertension
5	65/F	Osteoarthritis with Foot Swelling
6	60/F	Acute Venous Congestion Following Trauma
7	55/M	Herpes Zoster
8	70/F	Chronic Scalp Psoriasis

Table 2. Clinical Outcomes Following *Jalaukavacharana*

Case	Major Symptoms Before Treatment	Outcome After Treatment
1	Joint pain, stiffness, swelling	Pain reduction and improved mobility
2	Severe migraine headache	Marked reduction in headache intensity
3	Localized pain, swelling, ecchymosis, and hematoma formation following rubber-bullet injury	Reduction in pain, swelling, tissue congestion, and gradual resolution of the hematoma
4	Chronic joint pain	Improved pain and joint function
5	Foot swelling and discomfort	Reduced swelling and improved walking comfort
6	Venous congestion, edema	Improved circulation and reduction in edema
7	Burning, itching, skin eruptions	Relief from symptoms and lesion resolution
8	Itching, scaling, plaques	Improvement in scalp condition and reduced itching

Table 3. Number of Leech Sessions and Clinical Response

Case	Sessions	Follow-up	Outcome
RA	2	1 month	Pain reduction
Migraine	1	15 days	Reduced headache
Hematoma	1	2 weeks	Reduced edema
OA Knee	2	1 month	Improved mobility
OA Foot	2	1 month	Reduced swelling
Venous Congestion	1	2 weeks	Improved circulation
Herpes Zoster	Multiple	1 year	Resolution
Psoriasis	Multiple	6 months	Reduced plaques

Overall, all patients demonstrated favorable clinical responses following *Jalaukavacharana*. The most commonly observed benefits included reduction in pain, swelling, itching, burning sensation, and tissue congestion. Improvement in joint mobility and local circulation was also noted in musculoskeletal and

vascular conditions. Dermatological conditions such as herpes zoster and psoriasis showed progressive symptomatic relief and visible improvement in skin lesions during follow-up. No major adverse events, infections, allergic reactions, or significant complications were reported during the treatment period. The procedure was well tolerated by all patients included in the study.

Discussion

The present case series demonstrates the potential therapeutic value of *Jalaukavacharana* in a variety of inflammatory, vascular, musculoskeletal, and dermatological conditions. Across all eight cases, patients experienced clinical improvement characterized by reduction in pain, swelling, burning sensation, itching, tissue congestion, and functional impairment.

These observations support the traditional *Ayurvedic* indications of leech therapy and are consistent with findings reported in contemporary biomedical literature.[4–10] From an *Ayurvedic* perspective, *Jalaukavacharana* is one of the most important procedures of *Raktamokshana*, particularly indicated in disorders involving *Rakta Dushti*, *Pitta* aggravation, and localized inflammatory pathology. Classical texts describe its utility in conditions characterized by *Shoola* (pain), *Shotha* (swelling), *Daha* (burning sensation), *Kandu* (itching), and discoloration.[1–3].

The fundamental principle underlying the therapy is the removal of vitiated blood (*Dushta Rakta*), thereby reducing local pathological processes and restoring *Doshic* equilibrium. The favorable outcomes observed in the present cases, including arthritis, venous congestion, herpes zoster, and psoriasis, align closely with these classical descriptions. Modern scientific investigations provide a plausible biological explanation for these therapeutic effects. Medicinal leech saliva contains a complex mixture of bioactive molecules including hirudin, calin, destabilase, eglins, bdellins, hyaluronidase, and histamine-like substances.[4,5,11,12]

These compounds exhibit anticoagulant, anti-inflammatory, vasodilatory, thrombolytic, and analgesic properties.[4,5,11,12]. Hirudin acts as a potent thrombin inhibitor, preventing coagulation and improving blood flow, while calin inhibits platelet aggregation and prolongs local anticoagulant activity. Eglins and bdellins suppress inflammatory pathways by inhibiting proteolytic enzymes involved in tissue injury and inflammation.[4,5,11]The reduction in pain observed across multiple cases may be attributed to both the analgesic properties of leech saliva and the improvement of local microcirculation. Previous studies have demonstrated that medicinal leech therapy can significantly reduce pain intensity in osteoarthritis and other musculoskeletal disorders.[8,13,14].

Similar observations were made in the present study, where patients suffering from rheumatoid arthritis, chronic arthritis, and osteoarthritis reported rapid symptomatic relief and improved mobility following treatment. The beneficial outcome observed in the migraine case is particularly noteworthy. Migraine is often associated with neurovascular dysfunction and localized vascular disturbances. A randomized clinical trial conducted by *Bakhshi et al*. demonstrated that leech therapy was comparable to conventional treatment in reducing migraine severity and frequency[9]. The marked reduction in headache intensity observed in our patient supports these findings and suggests that *Jalaukavacharana* may serve as a valuable complementary intervention in selected cases of migraine.

The successful management of traumatic hematoma and venous congestion observed in Cases 3 and 6 may be explained by the well-established role of medicinal leeches in relieving vascular congestion. Contemporary reconstructive and microsurgical practices frequently utilize leech therapy to improve venous drainage and preserve tissue viability in congested grafts and flaps.[6,7,15,16] The improvement in Doppler findings and reduction in edema documented in the present study further support the microcirculatory benefits of leech therapy.

Dermatological conditions such as herpes zoster and psoriasis also demonstrated favorable responses. The reduction in burning sensation, itching, inflammation, and lesion severity observed in these patients may be attributed to the anti-inflammatory and immunomodulatory actions of leech saliva. Previous clinical studies have reported improvement in psoriasis symptoms following medicinal leech therapy, with significant reductions in disease severity scores and patient discomfort.[10,17] The outcomes observed in our psoriasis case are consistent with these findings. Similarly, the absence of post-herpetic neuralgia in the herpes zoster patient suggests that early intervention with *Jalaukavacharana* may have contributed to effective symptom control and improved healing. An important observation from the present study is the rapid onset of symptom relief.

Several patients reported improvement immediately or shortly after treatment, particularly in terms of pain, burning sensation, and tissue congestion. Such rapid effects are difficult to explain solely through bloodletting and are likely attributable to the pharmacological actions of salivary bioactive compounds. This observation highlights the convergence of *Ayurvedic* concepts of *Raktamokshana*

with modern biochemical understanding of medicinal leech therapy.

The study also demonstrates the versatility of *Jalaukavacharana* across a wide spectrum of clinical conditions. While most modern studies focus on individual diseases such as osteoarthritis or venous congestion, the present case series illustrates its applicability in diverse pathological states involving inflammation, vascular stasis, and tissue irritation. This broad therapeutic potential is consistent with the extensive indications described in *Ayurvedic* literature[1–3].

Despite these encouraging findings, several limitations must be acknowledged. The study is based on a small number of cases and lacks a control group. Objective outcome measures such as validated pain scales, inflammatory markers, quality-of-life assessments, and standardized disease severity scores were not consistently available. Furthermore, some patients received adjunctive *Ayurvedic* interventions, making it difficult to attribute all clinical improvements exclusively to *Jalaukavacharana*. The retrospective nature of the study also limits the ability to establish causality. Nevertheless, the integration of clinical observations with established pharmacological evidence strengthens the scientific credibility of the findings.

The consistency between classical *Ayurvedic* principles, observed clinical outcomes, and contemporary biomedical mechanisms provides compelling support for the continued exploration of medicinal leech therapy within integrative healthcare frameworks. Future studies should focus on randomized controlled trials, standardized treatment protocols, objective outcome assessments, and long-term follow-up to further validate the efficacy and safety of *Jalaukavacharana* in specific clinical conditions. Overall, the present study highlights *Jalaukavacharana* as a promising therapeutic modality that successfully bridges traditional *Ayurvedic* wisdom and modern scientific understanding. The favorable outcomes observed in this case series reinforce its potential role as a safe, cost-effective, and evidence-supported complementary treatment for selected inflammatory, vascular, musculoskeletal, and dermatological disorders.

Limitations and Future Research Directions

The present study provides preliminary clinical evidence supporting the therapeutic utility of *Jalaukavacharana* in a variety of inflammatory, vascular, musculoskeletal, and dermatological disorders. However, several limitations should be considered while interpreting the findings. First, the study is based on a relatively small case series comprising eight patients with diverse clinical conditions. Although the observed outcomes were favorable, the small sample size limits the generalizability of the findings.

Second, the absence of a control group prevents direct comparison with conventional treatment modalities and makes it difficult to completely exclude placebo effects or the influence of other therapeutic interventions. Another important limitation is the lack of standardized outcome measures. Clinical improvements were primarily assessed through patient-reported symptom relief, physical examination findings, and photographic documentation.

Objective assessments such as validated pain scales, quality-of-life measures, inflammatory biomarkers, and disease-specific scoring systems were not consistently available for all cases. Furthermore, the duration of follow-up varied among patients, limiting the assessment of long-term therapeutic outcomes and recurrence rates. The retrospective observational nature of the study also introduces the possibility of selection and reporting bias.

In addition, some patients received supportive *Ayurvedic* management alongside *Jalaukavacharana*, which may have contributed to the observed clinical improvements. Therefore, the independent effect of leech therapy cannot be fully established in all cases. Despite these limitations, the consistency of the observed outcomes across different disease conditions, together with the growing body of scientific evidence regarding the pharmacological properties of medicinal leech saliva, suggests that *Jalaukavacharana* warrants further investigation.

Future research should focus on large-scale randomized controlled trials with clearly defined inclusion criteria and standardized treatment protocols.[11,12,18] Objective outcome measures, including validated clinical scoring systems, laboratory biomarkers, imaging studies, and quality-of-life assessments, should be incorporated to improve the reliability of findings. Comparative studies evaluating *Jalaukavacharana* against standard medical therapies and other *Ayurvedic* interventions may further clarify its therapeutic role. [18,19] Long-term follow-up studies are also needed to determine the durability of clinical benefits and assess recurrence rates. Additionally, translational research exploring the molecular and immunological effects of medicinal leech saliva may help bridge traditional *Ayurvedic* concepts with modern biomedical science and facilitate wider acceptance of this ancient therapeutic modality.[11,12,20]

Conclusion

Jalaukavacharana, a classical *Ayurvedic* form of *Raktamokshana*, continues to demonstrate significant therapeutic potential in contemporary clinical practice. The present case series highlights its beneficial effects in a variety of inflammatory, vascular, musculoskeletal, and dermatological disorders, including rheumatoid arthritis, migraine, traumatic hematoma, osteoarthritis, venous congestion, herpes zoster, and psoriasis. Across all cases, patients experienced improvements in pain, swelling, itching, burning sensation, local circulation, and functional capacity, with no major adverse events reported.

The clinical observations documented in this study are supported by an expanding body of scientific evidence demonstrating that medicinal leech saliva contains numerous biologically active compounds, including hirudin, calin, eglins, bdellins, and other pharmacologically active molecules. These constituents exert anticoagulant, anti-inflammatory, vasodilatory, thrombolytic, and analgesic effects, providing a plausible scientific explanation for the therapeutic outcomes observed in both traditional and modern clinical settings.

The findings also reveal a remarkable convergence between classical *Ayurvedic* principles and contemporary biomedical understanding. The *Ayurvedic* concept of removing *Dushta Rakta* through *Jalaukavacharana* corresponds closely with modern observations regarding improved microcirculation, reduction of inflammatory mediators, relief of vascular congestion, and enhancement of tissue healing.[12,15,21] Such parallels strengthen the scientific credibility of this traditional therapeutic practice and support its integration within evidence-based complementary healthcare.

Although the present study is limited by its small sample size and observational design, the consistently favorable outcomes across diverse clinical conditions suggest that *Jalaukavacharana* is a safe, cost-effective, and potentially valuable therapeutic intervention when applied appropriately. Further well-designed clinical trials and mechanistic studies are required to establish standardized protocols and provide higher levels of evidence. Nevertheless, the current findings support the continued clinical application and scientific exploration of medicinal leech therapy as an important component of integrative medicine and *Ayurvedic* healthcare.

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