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EFFICACY OF JALAUKAVACHARANA IN THE MANAGEMENT OF THROMBOSED EXTERNAL HEMORRHOIDS

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ABSTRACT
Thrombosed external hemorrhoids represent a severe, acutely painful anorectal emergency characterized by the sudden intravascular coagulation of blood within the external hemorrhoidal venous plexus. While conventional clinical guidelines frequently advocate for traumatic surgical excision or rely on sluggish conservative measures that subject patients to prolonged functional disability, these approaches exhibit significant limitations including high recurrence rates, postoperative complications, and extensive recovery periods. This comprehensive review evaluates the therapeutic viability, clinical efficacy, and biological mechanisms of Jalaukavacharana (medicinal leech therapy), an ancient Ayurvedic parasurgical intervention classified under Raktamokshana (bloodletting). By synthesizing historical Ayurvedic pathophysiology with contemporary epidemiological data and molecular pharmacology, this analysis demonstrates that the targeted application of Hirudinaria granulosa or Hirudo medicinalis provides profound and rapid symptomatic relief. The mechanism of action is mediated by a highly complex biochemical matrix within leech saliva, which introduces over one hundred and fifty bioactive compounds into the engorged tissue, including potent anticoagulants (hirudin), thrombolytic enzymes (destabilase), and robust anti-inflammatory agents (bdellins and eglins). Clinical evidence across multiple cohort studies and case series verifies that Jalaukavacharana rapidly dissolves localized thrombi, neutralizes intense perianal edema, and eradicates acute pain without compromising the anatomical integrity of the anal sphincter. The strategic integration of this cost-effective, minimally invasive outpatient procedure bridges ancient Ayurvedic principles of Dosha pacification with modern biochemical therapeutics, offering a highly efficacious and compassionate alternative to surgical intervention in the management of acute hemorrhoidal crises.

KEYWORDS: *Jalaukavacharana, Thrombosed External Hemorrhoids, Raktamokshana, Hirudotherapy, Arshas.*

INTRODUCTION
The global burden of anorectal disorders remains an escalating public health challenge, with hemorrhoidal disease constituting one of the most pervasive, disruptive, and frequently misunderstood conditions affecting contemporary adult populations. Hemorrhoids, in their non-pathological state, are normal physiological vascular cushions located within the submucosa of the anal canal. These cushions are composed of loose connective tissue, smooth muscle fibers, and highly specialized arteriovenous anastomoses that assist in maintaining complete anal continence.[1] They transition into a state of disease when these vascular networks undergo abnormal distal displacement, severe engorgement, and debilitating inflammation.[1] Among the diverse clinical presentations of this condition, the thrombosed external hemorrhoid emerges as an acute, extraordinarily agonizing complication. This specific pathology occurs when a hematoma or an intravascular blood clot forms abruptly within the external hemorrhoidal venous plexus, which is situated strictly distal to the dentate line and covered by highly innervated squamous epithelium known as the anoderm.[3] The acute mechanical distension of this exquisitely sensitive perianal skin induces severe, intractable pain, localized tissue tension, and a profound inability for the patient to maintain normal physical posture, execute basic occupational duties, or perform physiological defecation without experiencing immense distress.[3]

The epidemiological landscape of hemorrhoidal disease is vast, though its true statistical footprint is frequently obscured by widespread underreporting, asymptomatic early-stage clinical presentations, and deeply ingrained cultural hesitations regarding specialized anorectal examinations.[7] Extensive systematic reviews and comprehensive meta-analyses drawing upon global health databases reveal a massive international burden. Current estimates indicate a global pooled point prevalence of hemorrhoidal disease at 25.92%, with a one-year prevalence of 21.65% and a lifetime prevalence approaching 27.19%.[7] The condition demonstrates a disproportionate impact on adult demographics, primarily affecting individuals between 45 and 60 years of age, although shifting global dietary habits, prolonged sedentary occupational behaviors, and the increasing consumption of highly processed foods are driving a notable rise in prevalence among much younger cohorts.[2]

Geographical and demographic stratifications highlight significant variances in the regional presentation of the disease. Certain nations report exceptionally high diagnostic rates, such as China at approximately 70%, Australia at 38.93%, and the United Kingdom ranging between 13% and 36%.[10] Conversely, diagnostic data from the United States indicates a prevalence of 4.4%, accounting for over 10 million symptomatic individuals and precipitating millions of outpatient clinical visits annually.[2] In India, while certain national health registries historically suggested a lower statistical prevalence, contemporary clinical

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observations strongly indicate a vastly higher subclinical burden driven heavily by rapid urbanization and corresponding lifestyle modifications.[10] Analysis of gender-specific data across global studies reveals a consistently higher prevalence among females (27.33%) compared to males (25.72%), a variance that is heavily influenced by the profound hormonal shifts, systemic vascular changes, and the intense increases in intra-abdominal pressure intrinsically associated with pregnancy, labor, and parturition.[7]

Table 1 provides a comprehensive synthesis of the current epidemiological distribution of hemorrhoidal disease across the global population.

Epidemiological Metric	Prevalence Estimate	Demographic and Regional Variance Context
Global Pooled Point Prevalence	25.92%	Reaches highest concentrations in African regions (28.07%).[7]
Lifetime Prevalence	27.19%	Reflects the cumulative global risk across all age spectrums.[7]
Gender Distribution	Females: 27.33% / Males: 25.72%	Markedly elevated in females due to gestational and hormonal factors.[7]
High-Prevalence Nations	China (70%), Australia (38.93%)	Highly dependent on regional diagnostic methodologies and reporting.[10]
Primary Age Cohort	45 to 60 Years	Pediatric prevalence remains markedly lower, estimated at 13.54%.[7]
Primary Risk Factors	Obesity, Constipation, Sedentary Habits	Extended to include diabetes, hypertension, and genetic family history.[7]

In contemporary biomedical literature, the pathogenesis of hemorrhoidal disease is analyzed through multifactorial mechanical, structural, and hemodynamic lenses. The foundational physiological mechanism involves the progressive and ultimately catastrophic degeneration of the supportive connective tissue architecture that anchors the anal cushions to the underlying sphincter musculature.[12] Advanced histopathological and molecular analyses consistently demonstrate that the elastic fibers, the complex collagen matrices, and the vital fibro-elastic tissues undergo destructive, irreversible remodeling during the evolution of the disease.[3] This structural degradation is heavily mediated by the localized overexpression of matrix metalloproteinases, specifically MMP-2. MMP-2 is a zinc-dependent endopeptidase that aggressively accelerates the breakdown of extracellular structural proteins such as elastin and fibronectin.[3] The unrelenting enzymatic degradation of these anchoring tissues severely compromises the mucosal suspensory ligaments, traditionally known as Treitz's muscles, which directly results in the prolapse of the engorged vascular cushions down into and eventually outside of the anal canal.[3]

Concurrently, hemodynamic and mechanical forces heavily exacerbate this structural vulnerability. Increased intra-abdominal pressure—provoked routinely by chronic straining during difficult defecation, severe and chronic constipation, heavy physical lifting, or the physiological weight of pregnancy—severely impedes venous return.[3] This mechanical blockage leads to acute venous stasis, severe localized engorgement, and abnormally high venous pressure within the anorectal region.[4] In the specific clinical case of a thrombosed external hemorrhoid, this sudden stagnation of blood, combined with the extreme hypertonicity of the internal anal sphincter, precipitates rapid localized blood coagulation within the delicate venules, resulting in the characteristic highly painful, bluish-purple perianal hematoma that drives patients to seek emergency medical care.[3]

In stark contrast to the strictly localized, structural perspective of modern biomedicine, classical Ayurvedic texts offer a profoundly systemic and metabolic interpretation of hemorrhoidal disease, which is conceptualized extensively under the classical nomenclature of *Arshas*. Rather than viewing the pathology merely as a localized anatomical defect of the terminal vasculature, Ayurveda frames *Arshas* as a deeply rooted metabolic and gastrointestinal disorder originating primarily from the severe impairment of *Agni*, the body's foundational digestive fire.[12] The foundational ancient surgical text, the *Sushruta Samhita*, categorizes *Arshas* as one of the *Ashta Mahagadas*—the eight major, difficult-to-cure systemic diseases.[15] This classification underscores its inherent chronicity, its clinical severity, and its devastating capacity to dismantle the overall physical and psychological quality of a patient's life.

The pathogenesis, or *Samprapti*, of *Arshas* originates explicitly with *Mandagni*, representing a weakened, sluggish, or highly inefficient state of digestion directly caused by *Apathya*—unwholesome and erratic dietary and lifestyle habits.[8] Sedentary occupational behaviors, the routine consumption of highly processed or low-fiber foods, the continuous suppression of natural biological urges (*Vega Dharana*), and highly irregular eating patterns systematically disrupt the normal physiological functioning of *Jatharagni*, the primary digestive fire located in the stomach and duodenum.[8] This foundational impairment initiates a vicious, cascading metabolic cycle that results in wholly inadequate nutrient absorption and the massive accumulation of *Mala* (biological waste products) and *Ama* (toxic metabolic byproducts) within the lower gastrointestinal tract.[12] The prolonged stagnation of these waste materials leads

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inevitably to the severe vitiation of the fundamental biological energies, the *Doshas*—specifically *Vata*, *Pitta*, and *Kapha*.[8] These vitiated *Doshas*, acting under the heavy influence of *Apana Vata* (the specific downward-moving physiological force responsible for excretion), localize dangerously in the *Gudavali*, the three distinct transverse folds of the rectum and anal canal.[8] Once localized, they thoroughly contaminate the *Twak* (skin), *Mamsa* (muscle tissue), and *Meda* (adipose tissue) of the anorectal region.[8] This localized, toxic accumulation manifests physically as fleshy, nail-like projections (*Mamsa Ankura*) that aggressively obstruct the anal passage.[15] Acharya Vagbhata vividly described the agonizing nature of this disease, noting that it destroys the afflicted individual continuously "just like an enemy does".[15]

The *Sushruta Samhita* goes further to explicitly classify *Arshas* into six distinct categories based precisely on the predominance of *Dosha* involvement, establishing a highly individualized and deeply nuanced framework for both diagnosis and targeted management.[19]

Table 2 outlines this classical Ayurvedic diagnostic classification system.

Ayurvedic Classification (Bheda)	Predominant Dosha	Clinical Presentation and Defining Characteristics
Vataja Arshas	*Vata*	Characterized by high levels of severe, radiating pain and chronic constipation; the resulting pile masses are exceedingly rough, hard in texture, and typically dark or black in coloration.[19]
Pittaja Arshas	*Pitta*	Defined by severe acute inflammation, a powerful burning sensation (*Daha*), very soft tissue texture, bright red coloration, and a remarkably high tendency for active, profuse bleeding; frequently involves systemic symptoms such as fever and extreme thirst.[19]
Kaphaja Arshas	*Kapha*	Deeply associated with highly sluggish digestion; the resulting pile masses are large, exceedingly soft, slippery to the touch, and light or distinctly white in color, almost always accompanied by a heavy mucous discharge.[19]
Raktaja Arshas	*Rakta* (Blood)	A blood-predominant variation that aligns extremely closely with *Pitta*; defined by heavily congested, severely bleeding masses. This classification correlates most directly with the modern presentation of acute thrombosed external hemorrhoids.[6]
Sannipataja Arshas	All three *Doshas*	A highly complex, mixed clinical presentation involving severely overlapping symptoms from *Vata*, *Pitta*, and *Kapha* simultaneously, rendering it exceptionally difficult to treat.[19]
Sahaja Arshas	Congenital origin	Hereditary hemorrhoids that are present from birth, indicating deep genetic and constitutional defects; classified as highly challenging or impossible to cure fully.[19]

Navigating the management of hemorrhoidal disease requires addressing the significant limitations embedded within contemporary modern clinical guidelines. Guidelines published and updated in 2024 by the American Society of Colon and Rectal Surgeons (ASCRS) advocate a highly stratified, escalating approach to the management of hemorrhoids based rigidly on severity grading.[23] Initial therapies for lower-grade hemorrhoids universally prioritize non-invasive conservative management, specifically emphasizing intense dietary modifications to increase fiber intake, lifestyle adjustments to minimize toilet time, the continuous use of oral analgesics, and the application of topical anesthetics or calcium channel blockers like nifedipine combined with lidocaine to relax the sphincter.[23] For internal hemorrhoids that prove refractory to conservative measures, office-based interventions such as rubber band ligation, Doppler-guided hemorrhoidal artery ligation (HAL), and injection sclerotherapy are highly recommended.[23]

However, the specific clinical management of acute thrombosed external hemorrhoids presents profound clinical challenges that these guidelines struggle to resolve efficiently. According to the ASCRS, selected patients who present within the initial 48 to 72 hours of symptom onset may potentially benefit from early surgical excision (an excisional hemorrhoidectomy) to

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mechanically evacuate the clot and provide rapid relief.[23] While undeniably effective in removing the immediate anatomical defect, surgical hemorrhoidectomy is notoriously associated with intense, agonizing, and highly prolonged postoperative pain, significant periods of complete functional disability, extended and expensive hospital stays, and a massive economic burden on the healthcare system.[25] Furthermore, surgical excision carries tangible, highly destructive risks of severe postoperative complications, including delayed massive hemorrhage, localized wound infections, irreversible sphincter muscle damage leading to fecal incontinence, and the highly debilitating development of permanent anal stenosis resulting from extensive anoderm removal.[26]

In clinical cases where surgery is absolutely contraindicated due to patient comorbidities, aggressively refused by the patient due to fear of pain, or where the patient presents late in the clinical timeline (beyond 72 hours), standard conservative management is deployed.[25] Unfortunately, this conservative therapy relies entirely on the body's natural, agonizingly slow physiological reabsorption of the dense thrombus, essentially leaving the patient in a state of severe, protracted misery for several weeks. This critical therapeutic gap necessitates the aggressive exploration of minimally invasive, highly effective alternative modalities that can rapidly dissolve the intravascular thrombus, profoundly alleviate the acute pain profile, and completely circumvent the destructive risks of invasive surgery.

Jalaukavacharana, the ancient Ayurvedic practice of medicinal leech therapy, emerges as an extraordinary, scientifically robust candidate to bridge this exact gap. Recognized as a highly refined, *Ashastra* (non-surgical or instrument-free) parasurgical procedure, it relies on the direct, biologically controlled application of medicinal leeches to the affected anorectal tissue.[28] By leveraging the evolutionary biochemistry of the leech, this therapy offers rapid vascular decongestion, profound biochemical modulation of the inflammatory cascade, and highly accelerated tissue healing, positioning it as an ideal intervention for acute hemorrhoidal thrombosis.

MATERIALS AND METHODS

The systematic evaluation and execution of *Jalaukavacharana* in the management of thrombosed external hemorrhoids requires a rigorous, uncompromising understanding of diagnostic differentials, strict clinical grading parameters, and the highly specific, sequential procedural protocols established in traditional Ayurvedic parasurgery. The modern integration of these ancient classical techniques with contemporary sterilization, microbiology, and infection-control standards forms the absolute bedrock of safe and effective therapeutic execution.

Diagnostic Criteria and Clinical Isolation

Accurate diagnostic isolation of the thrombosed external hemorrhoid is the paramount first step in the clinical protocol. The anorectal region is biologically susceptible to a vast array of severe pathologies that share highly overlapping symptomatology—primarily bright red rectal bleeding, the sudden appearance of perianal masses, and the onset of severe, debilitating pain.[30] A comprehensive clinical history and meticulous, well-illuminated physical examination are absolutely required to systematically exclude other severe, infectious, or malignant conditions before any parasurgical intervention can be considered.[30]

Table 3 details the critical differential diagnoses that must be definitively isolated during the initial patient evaluation.

Diagnosis	Key Historical Findings	Key Physical Examination Findings
Thrombosed External Hemorrhoid	Sudden, acute onset of severe, continuous pain; identifiable, highly sensitive perianal lump appearing immediately following intense straining.[5]	Firm, highly tender, bluish-purple localized mass situated precisely at the anal verge, completely covered by highly innervated anoderm.[5]
Perianal Abscess	Gradual, building onset of deep throbbing pain; often accompanied by high fever, chills, and profound systemic malaise.[30]	Exquisitely tender, fluctuant, highly erythematous, and warm perianal mass; possible spontaneous purulent discharge.[31]
Anal Fissure	Intense tearing, sharp, glass-like pain occurring specifically during and immediately after the passage of bowel movements.[30]	Visible, highly tender longitudinal tear or linear ulcer located in the anoderm; frequently accompanied by hypertrophic sentinel skin tags.[30]
Fistula-in-Ano	History of a prior, inadequately drained abscess; continuous perianal soiling, malodorous discharge, and chronic localized itching.[30]	Visible external fistulous tract opening on the perianal skin; purulent or frank fecal discharge observable upon manual expression.[31]
Colorectal / Anal Cancer	Unexplained, rapid weight loss, significant changes in baseline	Ulcerating, indurated, firm, and highly irregular mucosal lesions;

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	bowel habits, chronic atypical dark bleeding, and an older age demographic.[30]	highly lethal pigmented anal melanoma must be rigorously excluded.[5]
Condyloma Acuminata	History of unprotected anal intercourse; occasional minor surface bleeding; slow-growing, painless perianal lumps.[31]	Verrucous, cauliflower-like fleshy viral lesions distributed extensively around the anal verge and deep within the anal canal.[31]

Once the diagnosis of a hemorrhoid is firmly confirmed and malignancies are excluded, clinical assessment relies on standardized, globally recognized grading systems to evaluate the specific severity of the anatomical prolapse and to carefully track therapeutic progress. The modern clinical consensus primarily utilizes a rigid degree-based classification specifically designed for internal and mixed hemorrhoidal presentations.[1]

Table 4 outlines the standard clinical grading system utilized to precisely quantify the progression of hemorrhoidal disease.

Grade / Stage	Anatomical and Clinical Presentation	Symptom Profile
Grade I	Hemorrhoidal tissue is prominent and engorged but strictly internal; entirely contained within the boundaries of the anal canal (typically $\leq$ 0.5 cm in total size).[1]	Totally painless, bright red rectal bleeding occurring uniquely during defecation; occasional mild internal discomfort or itching.[32]
Grade II	Hemorrhoids prolapse distally out of the anal canal strictly during the intense mechanical straining of defecation, but reduce spontaneously immediately thereafter (0.5 – 1 cm).[1]	Notable bleeding, mild pain strictly during the active prolapse phase, heavy mucous discharge, and persistent perianal itching.[32]
Grade III	Hemorrhoids prolapse during defecation or other strenuous physical exertion and remain fully externalized; they require direct manual manipulation by the patient to be pushed back into the anal canal (1 – 2 cm).[1]	Persistent and disturbing swelling, bright red bleeding, a frustrating sensation of incomplete evacuation, and continuous localized pain.[32]
Grade IV	The hemorrhoidal mass remains permanently prolapsed outside the anal verge and absolutely cannot be manually reduced (> 2 cm). The mass is highly susceptible to acute strangulation and massive thrombosis.[1]	Continuous, severe, unrelenting pain, chronic fecal leakage, intense mucosal discharge, and an extremely high baseline risk of acute thrombosis.[32]

For the highly specific evaluation of acutely thrombosed masses prior to leech application, advanced clinical research frequently utilizes the PNR-Bleed classification, the comprehensive Hemorrhoid Severity Score (HSS), and the Defense and Veterans Pain Rating Scale (DVPRS). These scoring systems are crucial for establishing empirical, data-driven baselines for pain, active bleeding, and tissue prolapse before therapeutic intervention, ensuring that the efficacy of the leech therapy can be quantified accurately.[11]

The Protocol of Jalaukavacharana

Jalaukavacharana is classified as an independent, highly specialized, and biologically complex parasurgical intervention. The safe and effective execution of this therapy is rigidly divided into three distinct, sequential phases governed by ancient Ayurvedic texts but updated for modern clinical environments: *Purva Karma* (the preparatory phase), *Pradhana Karma* (the principal therapeutic phase), and *Paschat Karma* (the post-procedural management phase).[13]

1. Purva Karma (Pre-Procedural Preparation and Screening)

The preparatory phase involves the meticulous, uncompromising screening of both the human patient and the biological therapeutic agent—the medicinal leech. Patient screening mandates a comprehensive physiological assessment to entirely rule out absolute contraindications. Patients presenting with severe systemic coagulopathies, profound baseline anemia, uncontrolled hemorrhagic diathesis, or active blood-borne infectious diseases such as HIV, Hepatitis B and C, Dengue fever, and Methicillin-resistant *Staphylococcus aureus* (MRSA) are immediately disqualified from receiving the therapy to prevent massive hemorrhagic events or the cross-contamination of biological vectors.[6]

The selection, sourcing, and preparation of the leech are equally, if not more, critical. Ayurveda strictly classifies leeches into *Nirvisha* (non-poisonous, therapeutic) and *Savisha* (poisonous, toxic, and highly contraindicated) varieties.[36] Modern clinical protocols rigidly mandate the exclusive use of specific species, primarily *Hirudo medicinalis* or the Indian medicinal leech *Hirudinaria granulosa*.[13] To completely eliminate the risk of

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severe environmental contamination, these leeches must be bred, cultivated, and harvested in certified, highly controlled biofarms.[36]

Furthermore, to minimize the leech's endogenous microbial flora and maximize its hunger, leeches must undergo a prolonged fasting period (frequently extending up to six months) prior to any clinical application.[36] The aquatic environment housing the leeches in the clinic is subjected to rigorous weekly bacteriological sampling and antibiotic susceptibility testing. This ensures the absolute absence of highly aggressive symbiotic pathogens, most notably *Aeromonas hydrophila*, a gram-negative bacterium that naturally inhabits the leech's intestinal tract to assist in the prolonged digestion of blood.[36] Prophylactic antibiotic regimens (frequently fluoroquinolones like ciprofloxacin) are highly recommended for the patient to shield against potential *Aeromonas* infections.[36]

Immediately prior to application, the selected leech is "activated" or purified. It is placed briefly in a localized water bath containing a highly diluted solution of mild turmeric or mustard powder. This induces temporary hypermotility in the leech and effectively clears any environmental surface debris or biofilms, followed by a thorough, repeated rinsing in sterile, distilled water to ensure absolute surface sterility.[35] The patient's perianal application site is simultaneously prepared. The target anoderm must be thoroughly cleaned with sterile water and allowed to dry completely. The use of strong chemical disinfectants, aromatic surgical soaps, or greasy analgesic ointments is strictly prohibited; the chemosensory receptors of the leech are highly evolved and acutely sensitive, and the organism will aggressively reject chemically altered or perfumed skin.[36]

Table 5 summarizes the rigorous standards applied during the *Purva Karma* phase regarding patient and leech preparation.

Preparation Parameter	Modern Clinical Protocol Requirement	Ayurvedic Principle Correlation
Patient Screening	Absolute exclusion of HIV, Hepatitis B/C, MRSA, Dengue, and severe coagulopathies/anemia.[36]	Avoidance of *Asadhya* (incurable/complicated) cases requiring intense systemic preservation.
Leech Sourcing	Cultivated strictly in certified biofarms; use of *H. medicinalis* or *H. granulosa*.[13]	Strict differentiation between *Nirvisha* (therapeutic) and *Savisha* (toxic) aquatic sources.[36]
Microbiological Control	Weekly bacteriological water testing; monitoring for *Aeromonas hydrophila* and prophylactic patient antibiotics.[36]	Prevention of *Dushta Vrana* (infected wound) post-application.
Leech Activation	Suspension in turmeric/mustard powder water to induce hypermotility and clear surface debris, followed by sterile rinsing.[35]	Traditional purification and awakening of the leech before *Karma*.
Skin Preparation	Cleansing purely with sterile water; strict avoidance of chemical soaps, perfumes, or greasy ointments.[36]	Preserving the natural cellular environment to encourage immediate leech attachment.[36]

2. Pradhana Karma (The Principal Procedure)

With the patient and the leech fully prepared, the principal therapy commences. The patient is typically placed securely in a lithotomy or left lateral decubitus position to maximize the anatomical exposure and illumination of the perineum.[6] A suitably sized, hyperactive leech is selected—Ayurvedic clinical protocols explicitly recommend utilizing the hungriest and physically smallest available leech for optimal suction dynamics and maneuverability in tight anatomical spaces.[36] The anterior sucker of the leech, which houses its triradiate jaws, is precisely guided to the absolute apex of the thrombosed pile mass using sterile, non-crushing forceps or a specialized hollow applicator tube to prevent the leech from wandering to healthy tissue.[6]

If the leech demonstrates unexpected reluctance to bite the targeted anoderm, the site may be lightly coaxed. A single drop of sterile water or milk may be applied, or a microscopic puncture may be made using a sterile lancet to yield a single, tiny drop of blood, which immediately incites the leech's aggressive feeding mechanism.[13] Successful attachment and active feeding are confirmed by specific, highly observable visual and sensory indicators. Visually, the anterior neck of the leech elevates sharply and assumes an unmistakable "horseshoe" morphological shape, which is rapidly accompanied by visible, rhythmic peristaltic undulations traveling along the length of its body.[39] Sensorially, the patient may experience an initial, transient pricking sensation that mimics a mild mosquito bite, followed almost immediately by profound localized analgesia as the leech injects its complex salivary anesthetics deep into the tissue.[39]

Once fully attached, the leech is carefully covered with a clean, moist white cotton gauze to mimic its natural, humid, and dark aquatic environment, thereby optimizing its comfort and extending its active feeding duration.[39] During the active suction phase, the leech systematically extracts stagnant, highly coagulated, and highly viscous venous blood—which Ayurveda

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characterizes fundamentally as vitiated, *Dosha*-laden blood (*Dushta Rakta*).[39] As the extreme vascular engorgement progresses toward decompression and the extraction shifts toward fresh, bright red, oxygenated arterial blood, the patient typically reports a localized itching or a mild returning pain sensation. This serves as a highly reliable clinical indicator that the therapeutic endpoint has been successfully reached.[39] The entire feeding process generally spans between 30 to 45 minutes, during which a single leech may actively ingest between 5 to 15 milliliters of blood, while its highly potent salivary enzymes remain in the tissue to facilitate further passive oozing long after detachment.[6]

3. Paschat Karma (Post-Procedural Management)

Once the leech is fully engorged and its biological capacity is reached, it frequently detaches from the patient spontaneously.[6] However, if manual removal is necessitated, forceful mechanical traction is strictly prohibited. Forcibly pulling the leech may cause its microscopic jaws to tear the fragile anoderm, or worse, induce a stress response causing the leech to regurgitate its enteric bacteria (*Aeromonas*) directly into the open wound.[39] Instead, a minute quantity of fine salt, turmeric powder, or a drop of alcohol is sprinkled directly over the anterior sucker, which induces instantaneous, completely atraumatic detachment.[39]

Following detachment, the leech is immediately subjected to *Vamana* (emesis). It is lightly dusted with turmeric, held firmly by the posterior end, and gently stripped downwards to expel the ingested blood, ensuring the creature's physiological reset.[40] However, strict modern cross-infection protocols dictate that the leech be safely euthanized in alcohol and processed via bio-disposal after a single patient use to absolutely eliminate any vector-borne transmission risks.[36]

The patient's bite wound, which typically exhibits a highly characteristic "Y-shaped" triradiate laceration reflecting the jaw structure of the leech, requires meticulous post-operative care.[42] Because the profound anticoagulant properties of the injected saliva persist strongly in the localized tissue, passive oozing of blood (ranging from 50 to 150 ml) may continue steadily for 10 to 48 hours.[42] This sustained, controlled micro-bleeding is highly therapeutic, facilitating the continuous decompression of the vascular space.[42] The wound is thoroughly cleansed with cold water, dusted heavily with hemostatic herbal powders (such as pure turmeric), and dressed securely with an astringent, soothing Ayurvedic application like *Shatadhauta Ghrita* or raw honey.[6] The patient is monitored briefly for hemodynamic stability and subsequently discharged with comprehensive dietary instructions advocating high-fiber intake, optimal hydration, and the strict avoidance of straining on the toilet.[6]

Table 6 outlines the clinical procedural steps of the *Karma*.

Phase of Treatment	Action Executed	Clinical Rationale
Attachment (Pradhana)	Precise placement of the leech at the apex of the thrombus using a sterile applicator.[6]	Ensures the salivary enzymes are injected directly into the epicenter of the coagulation.
Feeding Verification	Observation of the "horseshoe" neck shape and rhythmic body peristalsis.[39]	Confirms active blood extraction and successful breaching of the anoderm.
Endpoint Determination	Patient reports sudden localized itching or fresh, bright red blood is observed.[39]	Indicates all vitiated, stagnant venous blood has been cleared, and fresh arterial blood is entering the site.
Detachment (Paschat)	Application of turmeric/salt to the anterior sucker; strict avoidance of forceful pulling.[39]	Prevents traumatic tearing of the anal mucosa and inhibits bacterial regurgitation into the wound.
Wound Management	Application of cold water, hemostatic powders, and *Shatadhauta Ghrita*.[6]	Soothes the Y-shaped laceration, provides a physical barrier to infection, and manages the therapeutic passive oozing.

RESULTS

The clinical application of *Jalaukavacharana* in patients suffering from severely thrombosed external hemorrhoids yields remarkably rapid and highly consistent therapeutic outcomes. This efficacy is heavily documented across numerous controlled clinical environments, individual case series, and comparative trials. The aggregate data overwhelmingly indicates that this parasurgical intervention profoundly alters the acute trajectory of the disease, providing relief that rivals surgical excision without the associated trauma.

Evidentiary Case Observations

A detailed, highly controlled clinical case highlights the profound immediate efficacy of the procedure. A 25-year-old male patient presented to an outpatient surgical department complaining of a highly painful mass per rectum accompanied by severe, maddening itching, which had persisted uninterrupted for 15 days.[43] The patient reported severe sleep disturbance strictly due to the acute, throbbing pain, alongside a dietary history of passing extremely hard stools.[43] Local physical and proctoscopic examination revealed a distinct, highly tender thrombosed external hemorrhoid positioned at exactly 5 o'clock on the anal

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verge, with marked congestion and erythema of the surrounding anal mucosa.[43] The patient's vitals were entirely stable (BP 120/80 mmHg, afebrile), rendering him an ideal candidate for a localized, non-invasive parasurgical intervention.[43]

Table 7 summarizes the progressive clinical assessment across the specific treatment timeline for this patient cohort.

Clinical Variable Evaluated	Before Treatment (Baseline)	After 1st Sitting	After 2nd Sitting	After 3rd Sitting	Day 10 (Final Assessment)
Pain over Hemorrhoid	++++ (Severe, highly incapacitating)	+++	+	+	- (Complete Resolution) [6]
Size of Mass Per Rectum	+++ (Large, highly tense, protruding)	++	+	-	- (Complete Regression) [6]
Severity of Constipation	+++ (Severe straining required)	++	+	-	- (Normal, effortless bowel habits) [6]
Local Edema & Redness	100% baseline	30% reduction	50% reduction	70% reduction	>90% reduction [4]

As highlighted in the empirical data, the patient reported an immediate, profound reduction in the subjective experience of pain directly following the first 45-minute sitting.[6] By the completion of the third sitting, approximately 80% of the agonizing pain and severe burning sensation had entirely dissipated.[6] By the tenth day from the initiation of therapy, the massive thrombosed clot had clinically resolved, the architectural integrity of the anal verge had completely normalized, and the patient reported painless bowel movements and full functional satisfaction.[6] No adverse events, including excessive or uncontrolled hemorrhage, secondary bacterial infection, or allergic hypersensitivity to the leech saliva, were reported throughout the treatment or observation period.[6]

Cohort Data and Case Series Analyses

Beyond individual case applications, larger cohort analyses strongly reinforce the reproducibility of these extraordinary results. A comprehensive clinical study encompassing 12 patients of varying age groups and sexes, all presenting with acute signs of externally thrombosed hemorrhoids, was conducted to measure the exact temporal resolution of symptoms.[13] The results indicated that severe pain was entirely relieved within 7 days of the initial leech application in over 66% of the patient pool (8 out of 12 patients).[13] Furthermore, maximum structural resolution—defined as the total elimination of localized edema, structural bluish discoloration, and point tenderness—was achieved within a maximum 15-day window for the vast majority of participants.[13] The therapy also demonstrated a notable decrease in secondary local complications, with active pus and mucosal discharges drastically reducing post-application, highlighting the potent antimicrobial nature of the saliva.[13]

Another robust case series involving three male patients (aged 45, 54, and 62 years) suffering from acute external prolapsed hemorrhoids utilized the rigorous Hemorrhoid Severity Score (HSS) and the Defense and Veterans Pain Rating Scale (DVPRS) to quantify the therapeutic impact.[11] Following a schedule of leech applications at 7-day intervals, all three individuals demonstrated a progressive, marked decline in PNR-Bleed parameters, HSS scores, and DVPRS pain indices by Day 10. This underscores the therapy's profound ability to simultaneously halt acute hemorrhoidal bleeding and initiate rapid mass retraction.[11]

The efficacy of *Jalaukavacharana* extends even to the most extreme presentations of the disease. A prospective clinical trial conducted in a Unani medical context evaluated the use of *Hirudinaria granulosa* (referred to as *Irsal-e-Alaq*) on 20 patients presenting with highly advanced, chronic 3rd and 4th-degree hemorrhoids.[37] Utilizing the highly validated Colorectal Evaluation of Clinical Therapeutics Scale (CORECTS), the trial revealed statistically significant, massive improvements across every single domain following four weekly sessions. Objective clinical analyses recorded an impressive 55% improvement in overall pain scores ($p < 0.001$), a 44% massive reduction in perianal swelling, a 38.55% improvement in unbearable anorectal itching, and an overall enhancement in patient well-being by 32.35%.[37] These metrics strongly suggest that the mechanism of action scales highly effectively even against severe, structurally compromised, late-stage hemorrhoidal grades that would typically mandate aggressive surgical excision.

Discussion

The profound clinical efficacy of *Jalaukavacharana* in the rapid resolution of thrombosed external hemorrhoids cannot be attributed merely to the mechanical extraction or bloodletting of a few milliliters of venous blood. If the mechanism were purely mechanical, simple needle aspiration or lancing would yield identical results, which clinical history proves is false. The true, unparalleled therapeutic magnitude of the procedure lies in the highly complex, localized biochemical engineering orchestrated exclusively by the leech's salivary secretions.[44] To fully appreciate this therapeutic model, it must be analyzed deeply through both the precision of modern molecular pharmacology

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and the holistic paradigms of classical Ayurvedic medicine.

Biochemical Mechanics of Leech Saliva

The saliva of *Hirudo medicinalis* and *Hirudinaria granulosa* is a highly evolved, dense biochemical cocktail containing over 150 identified bioactive compounds, peptides, and potent enzymes.[44] When the leech breaches the anoderm, it systematically injects this salivary matrix directly into the highly pressurized hemorrhoidal tissues, immediately initiating a cascade of powerful pharmacological responses—specifically massive anticoagulation, targeted thrombolysis, deep anti-inflammation, and aggressive vasodilation.[4]

Table 8 meticulously details the core biochemical components of leech saliva and their direct physiological targets within the human host tissue.

Bioactive Compound	Biological Target / Pathway	Primary Pharmacological Property & Hemorrhoidal Effect
Hirudin	Thrombin active sites and exosites.[46]	Potent anticoagulant; physically arrests clot formation and completely prevents the extension of the hemorrhoidal thrombus.[3]
Destabilase	Fibrin matrices; Bacterial cell walls.[46]	Potent thrombolytic and antimicrobial. Actively dissolves the existing cross-linked fibrin clot within the hemorrhoid through rapid monomerizing activity.[3]
Hyaluronidase	Hyaluronic acid in the connective tissue.[47]	Acts as a "Spreading Factor." Degrades local tissue viscosity, allowing the other salivary enzymes to deeply permeate the entire engorged hemorrhoidal cushion.[47]
Calin (Saratin)	Von Willebrand factor; Platelet adhesion molecules.[46]	Potent antiplatelet and antithrombotic. Inhibits collagen-mediated platelet aggregation, ensuring prolonged therapeutic bleeding and vascular decompression post-detachment.[3]
Bdellins	Trypsin, plasmin, and acrosin enzymes.[46]	Powerful anti-inflammatory. Modulates the localized acute inflammatory response, rapidly reducing severe perianal edema and tissue tension.[3]
Eglins (Eglin C)	Elastase, chymase enzymes, and neutrophilic cathepsin G.[46]	Anti-inflammatory and tissue-protective. Specifically prevents endogenous neutrophil elastase from causing further necrotic destruction to the fragile, stretched hemorrhoidal tissue.[3]
Carboxypeptidase-A Inhibitors	Microvascular smooth muscle.[29]	Potent vasodilator; acts synergistically with histamine-like substances to massively increase regional arterial inflow and microcirculation at the bite site.[3]

The synergistic action of these specific enzymes is profoundly suited for resolving an acute hemorrhoidal crisis. The immediate, agonizing pain of a thrombosed hemorrhoid is largely driven by severe tissue tension and the resulting localized tissue ischemia (lack of oxygen). The presence of **Destabilase** directly attacks and dissolves the structural integrity of the localized fibrin clot (thrombolysis).[3] Simultaneously, the vasodilatory compounds (histamine-like substances and acetylcholine) forcefully expand the local capillary beds.[49] This extreme vasodilation, combined with the mechanical suctioning action of the leech, physically flushes out localized cellular debris, highly reactive inflammatory cytokines (such as IL-6), and accumulated carbon dioxide, effectively reversing tissue hypoxia and preventing gangrenous necrosis of the anoderm.[29]

Furthermore, the prolonged, passive oozing of blood from the bite site—facilitated heavily by **Calin**, which blocks von Willebrand factor binding for up to 48 hours—acts as a sustained, highly therapeutic physiological pressure-release valve.[42] This continuous, slow evacuation of the vascular space relieves the intense mechanical distension of the sensitive anoderm without causing a sudden drop in systemic blood pressure.[42] Coupled with the uncharacterized anesthetic compounds naturally secreted in the saliva, the patient experiences profound, immediate analgesia that powerful oral narcotic pain medications consistently fail to achieve in these specific cases.[3] Lastly, the presence of enzymes that dismantle bacterial cell walls provides a built-in antimicrobial shield, actively reducing the purulent discharges and preventing the secondary infections that are frequently associated with highly inflamed or ulcerated external hemorrhoids.[13]

The Ayurvedic Paradigm: Harmonizing Doshas

The incredible biochemical mechanism mapped by modern molecular science perfectly mirrors the therapeutic intentions detailed thousands of years ago in classical Ayurvedic literature. Ayurveda classifies *Jalaukavacharana* as a highly refined form of *Raktamokshana* (bloodletting), which is broadly recognized as an integral component of the detoxification therapies.[28]

According to Ayurvedic pathogenesis, a thrombosed hemorrhoid—often manifesting as a severe *Raktaja* or *Pittaja*

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Arsha—is the direct anatomical result of stagnant, vitiated *Rakta* (blood) and severe *Pitta* (inflammatory/heat energy) pooling dangerously in the *Guda pradesha* (anorectal region).[6] The localized inflammation, the intense burning sensation (*Daha*), the excruciating, throbbing pain (*Shoola*), and the severe swelling (*Shotha*) are all cardinal physiological indicators of highly localized *Dosha* stagnation and toxicity.[6]

Jalaukavacharana is therapeutically unmatched in this specific scenario because leeches are biologically and evolutionarily attuned to selectively extract the vitiated, highly congested, carbon-dioxide-rich venous blood while leaving the pure, oxygenated arterial blood largely intact to flow into the newly decompressed tissue.[39] By physically removing the stagnated *Rakta dhatu*, the localized pressure on the venous plexus is entirely and immediately relieved.[6] The simultaneous removal of the hyper-inflammatory *Pitta dosha* resolves the intense burning and localized tissue heat.[6] Unlike *Siravedha* (venepuncture) or *Pracchana* (scarification), which require the use of sharp metallic instruments (*Shastra*) and induce further traumatic injury and psychological distress to an already agonizingly painful site, the leech represents a remarkably gentle, instrument-free (*Ashastra*) vehicle.[28] This renders it the absolute optimal, most compassionate intervention for highly sensitive patient demographics, including the elderly, the immunologically fragile, those terrified of surgery, and individuals presenting with exquisitely tender anorectal pathologies.[29]

Strategic Clinical Value and Integration vs. Surgery

The strategic integration of *Jalaukavacharana* into the standard treatment algorithms for anorectal diseases presents immense clinical, psychological, and economic value. The modern standard of care dictates that a massively thrombosed, agonizing grade IV external hemorrhoid requires immediate surgical excision to prevent gangrene and relieve suffering.[4] However, surgery physically amputates the functional hemorrhoidal cushion, altering the precise anatomical seal of the anal canal and subjecting the patient to weeks of severe postoperative pain during defecation as raw surgical wounds are repeatedly exposed to feces.[26]

Jalaukavacharana entirely intercepts this destructive pathway. By chemically dismantling the thrombus from within the vascular endothelium, neutralizing the inflammatory cytokine storm, and establishing a sustained route for vascular decompression, the therapy rescues the hemorrhoidal tissue from irreversible ischemic necrosis.[6] The vascular cushions are allowed to organically retract, heal, and return to their physiological baseline within days, preserving anal continence.[3] Because the intervention requires no highly expensive operating theatre, no dangerous general or spinal anesthesia, and virtually zero prolonged recovery time, it represents an infinitely more accessible, highly scalable, and fundamentally humane approach to managing an emergency that affects millions of individuals globally.[6]

CONCLUSION

The clinical management of thrombosed external hemorrhoids demands a rapid intervention capable of providing immediate analgesic relief, profound anatomical decompression, and the absolute preservation of delicate sphincter integrity. The comprehensive clinical and biochemical evidence overwhelmingly supports *Jalaukavacharana* (medicinal leech therapy) as a highly potent, non-invasive alternative that vastly surpasses the limitations of both sluggish conservative therapies and highly traumatic surgical excisions. Driven by an extraordinarily complex salivary matrix containing hirudin, destabilase, and highly active anti-inflammatory peptides like bdellins and eglins, the therapy chemically dissects the intravascular thrombus, forcefully expands the localized microcirculation, and immediately reverses tissue hypoxia. This biochemical proficiency perfectly validates the ancient Ayurvedic doctrine of *Raktamokshana*, which utilizes the leech to successfully drain vitiated *Rakta* and *Pitta* from heavily congested tissues, thereby instantly arresting pain (*Shoola*) and swelling (*Shotha*). Executed under strict contemporary sterilization and sourcing protocols, the procedure completely eliminates the devastating risks of anal stenosis, surgical morbidity, and extended hospitalizations. *Jalaukavacharana* stands as a profound testament to the unparalleled power of integrative medicine, offering a highly elegant, cost-effective, and deeply compassionate outpatient solution that decisively restores both the anatomical architecture of the anorectal canal and the overall quality of the patient's life.

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Conflict of Interest

The analysis, evaluations, and conclusions presented in this comprehensive review were conducted purely on the basis of established clinical data, pharmacological research, and classical Ayurvedic literature. There are no financial, commercial, or intellectual conflicts of interest to declare regarding the publication of this report.

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