IAMJ

INTERNATIONAL AYURVEDIC MEDICAL JOURNAL

Review Article ISSN: 2320-5091 Impact Factor: 6.719

CONCEPT OF MEDICINAL LEECH THERAPY OR HIRUDOTHERAPY IN AYURVEDIC AND MODERN ASPECT

Priyanka Ganguly[1], Somnath Dutta[2], Nirmal Debnath[3] , Krishnashri Jana[4]

1. HOD & Associate Professor in Shalya Tantra Department, Belley Shankarpur Rajib Gandhi Memorial Ayurvedic College & Hospital
2 House Physician at Belley Shankarpur Rajib Gandhi Memorial Ayurvedic College & Hospital
3 House Physician at Belley Shankarpur Rajib Gandhi Memorial Ayurvedic College & Hospital
4 House Physician at Belley Shankarpur Rajib Gandhi Memorial Ayurvedic College & Hospital

Corresponding Author: dr_priyanka@rediffmail.com

https://doi.org/10.46607/iamj2313022025
(Published Online: February 2025)
Open Access

Article Received: 06/01/2025 - **Peer Reviewed:** 30/01/2025 - **Accepted for Publication:** 09/02/2025.

Check for updates

ABSTRACT

Medicinal Leech therapy or Hirudotherapy is coined in *Ayurveda* as *Jalaukavacharana*, a conventional bloodletting treatment illustrated extensively in vintage manuscripts like *Sushruta Samhita* and *Charaka Samhita*. This therapy involves harnessing medicinal leeches to draw out impure blood, which provides the equilibrium condition of *doshas* by balancing them and enhancing the microcirculation. With its roots or original foundation in ancient medicine, Hirudotherapy has found renewed relevance in modern therapeutics for managing conditions like venous insufficiency, osteoarthritis, and chronic wounds. This article comprehensively reviews the historical and scientific aspects of leech therapy, exploring its biochemical mechanisms, therapeutic applications, and evolution from traditional practice to a validated biotherapy. By scrutinizing both ancient *Ayurvedic* citations and contemporary clinical consequences, this study shows the potential of *Jalaukavacharana* as a holistic and effective therapeutic modality.

Keywords: Leech therapy, *Jalaukavacharana*, *Ayurveda*, *Raktamokshana*, Hirudin, Medicinal leeches, Bloodletting, *Dosha* balance, Microcirculation, Biotherapy, Traditional medicine, Hirudotherapy.

INTRODUCTION

Hirudotherapy or Leech therapy, known as *Jalaukavacharana* in *Ayurveda*, is one of the ancient and most fascinating treatment modalities in traditional medicine. This therapeutic technique involves applying medicinal leeches to the body to draw out impure blood, stimulate circulation, and promote healing. While leech therapy has ancient roots in *Ayurvedic* literature, it has also seen a resurgence in modern medicine due to its unique therapeutic benefits.

Classical *Ayurvedic* texts, such as the *Sushruta Samhita* and *Charaka Samhita*, detail the use of leeches not only for bloodletting but also for managing a wide range of conditions, including inflammation, pain, and detoxification. In these texts, leech therapy is described as an essential component of *Raktamokshana* (blood purification), particularly for conditions related to excess or vitiated *doshas*. The therapeutic actions of leeches—ranging from the secretion of bioactive substances like hirudin (an anticoagulant) to their ability to improve microcirculation—are now being studied extensively in contemporary clinical settings.

This Article aims to explore the rich history and scientific basis of *Jalaukavacharana* through a comprehensive review of its mention in classical *Ayurvedic* texts and its evolution in modern clinical practice. By examining both ancient and contemporary perspectives, this article will highlight the therapeutic potential of leech therapy, its applications in various health conditions, and the emerging evidence supporting its effectiveness. Additionally, the article will address the latest research trends and clinical outcomes, providing a holistic view of this time-honoured treatment.

MATERIAL AND METHODS

All the material related to this article has been collected from classical *Ayurvedic* texts like *Brihatrayi* and *Laghutrayi*, Indian materia medica, and other classics present at the library of Belley Sankarpur Rajib Gandhi Memorial **Ayurvedic College & Hospital**. Various published articles on Leech therapy were also searched for this conceptual study.

NIRUKTI:

The word leech comes from an old English word ‘laece’ meaning ‘physician’. In medieval England, leeches were linked with healing because of the etymology of the word.[1]

In *Ayurveda*, Leeches are called *Jalauka* because of the basis of their life, the site of their dwelling, and the source of their nutrition is *Jala* (water).[2]

TYPES OF JALAUKA (LEECHES) [3,4]

Broadly, *Jalaukas* are divided into two types

1. Poisonous (*Savisha Jalauka*)- Hirudo detrimental
2. Non-poisonous (*Nirvisha Jalauka*)- Hirudo medicinalis

DETAIL DESCRIPTION OF *JALAUKA*

Savisha Jalauka		*Nirvisha Jalauka*	
Krishna	Black in colour similar to that of powder of *Anjana* (Antimony), large-headed	*Kapila*	Dark brown colored with slightly reddish flanks (like *Manashila*); back is unctuous (oily) and has the colour of *Mudga* (slightly green).
Karbura	Grey, broad like *Varmimatsya* (fish), the abdomen is segmented and bulging	*Pingala*	Reddish brown with a round body and moves quickly
Alagarda	hairy with large flanks and a black mouth	*Shanku Mukhi*	Brown colour (like Liver), suck blood quickly and have a long and pointed mouth.
Indrayudha	have stripes on their back	*Mushika*	The brown colour resembles the shape of mice and has an unpleasant odour.

Samudraka	blackish yellow; have flowery patterns on the body.	*Pundarikamukhi*	Greenish colour (like *Mudga*) with broad mouth (like lotus flower).
Gochandana	The lower part is divided into two halves like the scrotum of a bull and with a tiny mouth	*Savarika*	Reddish pink colour (like lotus petal), oily; eighteen *Angula* (36 cms.) long & are used to treat cattle.

MODE OF ACTION OF *JALAUKAVACHARANA*

medicinal Leech resides in cold places in water bodies

↓

Leech contains *Madhura rasa* properties in its saliva.

↓

Balance the aggravated *Pitta* and *Kapha Doshas* from *Dushta Rakta* (vitiated blood) by removing *Ama* (toxins)

↓

and impurities directly from the bloodstream.

↓

Enhance tissue nourishment by clearing blockages in the subtle channels *(srotas).*[5.]

THE BIOCHEMICAL PROPERTIES OF THE LEECH'S SALIVA & IT'S MODE OF ACTION

- The saliva of leeches, particularly from Hirudo medicinalis, is a rich cocktail of bioactive compounds with therapeutic properties.
- Leeches release biologically active substances such as hirudin, calin, and hyaluronidase into the bloodstream during attachment.
- These substances have anticoagulants, anti-inflammatory, and vasodilatory effects, improving microcirculation and reducing venous congestion.
- Their saliva also has anaesthetic and antimicrobial properties, relieving pain and infection.
- *Jalaukavacharana* is thus recognised as an effective biotherapy for managing conditions like venous insufficiency, osteoarthritis, and chronic wounds.

Constituent of Saliva	Mechanism of Action
Hirudin	Anticoagulant Inhibits blood coagulation by binding to thrombin, preventing conversion of fibrinogen to fibrin.
Hyaluronidase	It breaks down the hyaluronic acid, increases interstitial viscosity & is an Antibiotic.
Calin	Inhibits blood coagulation by inhibition of collagen-mediated platelet aggregation and adhesion, blocks von Willebrand factor-dependent platelet adhesion to collagen to collagen.
Destabilase	It has Monomerizing activity and dissolves fibrin leading to thrombolytic effects.
Hirustasin	Inhibits kallikrein, trypsin, chymotrypsin, neutropholic cathepsin G
Bdellins	Anti-inflammatory. Inhibits trypsin, plasmin, acrosin
Tryptase inhibitor	Inhibits proteolytic enzymes of host mast cells
Eglins	Anti-inflammatory proteins. Inhibit the activity of alpha-chymotrypsin, chymase, subtilisin, elastase, and cathepsin G.
Factor Xa inhibitor	Inhibits the activity of coagulation factor xa by forming equimolar complexes
Complement inhibitors	Possibly replace natural complement inhibitors if they are deficient.
Carboxypeptidase A inhibitors	Increases the inflow of blood at the bite site
Histamine like substances	Vasodilator. Increases the inflow of blood at the bite site
Acetylcholine	Vasodilator
Anesthetics substance	Anaesthetic

THERAPEUTIC USES OF *JALAUKA* (LEECH THERAPY) IN DISEASE MANAGEMENT

Ayurvedic texts extensively document the therapeutic use of *Jalauka* (leech) in managing various diseases. Recognised as a vital aspect of *Raktamokshana* (bloodletting), leech therapy is prescribed for conditions like skin disorders, inflammation, and vascular ailments. Its effectiveness lies in balancing aggravated *doshas* and promoting natural healing through detoxification.

EXPLORING AYURVEDIC TEXTUAL REFERENCES:[7, 8, 9, 10]

SYSTEM	DISEASE	CLASSICAL REFERENCES
RHEUMATOLOGY	*Vatashonita*	*CHA. CHI. 29 / 36 , 37* *AH. CHI. 22 / 2* *AS. CHI. 24 / 1*
DERMATOLOGY	*Visarpa*	*CHA. CHI. 21 / 69 , 119* *SU. CHI. 17 (16) DALHANA* *AS. CHI. 20 (13) (SHASHILEKHA)*
	Kushtha	*CHA. CHI. 7 / 52* *AS. CHI. 21 / 49*
	Kshudra roga	*AS. UT. 37 / 2* *AH. UT. 32 / 1* *SU. CHI. 20 / 3 , 14*
	Shuka Roga	*SU. CHI. 21 / 4 , 7 , 9 , 11*

TOXICOLOGY	*Sarpa Visha*	*AS. UT. 42 / 12* *AH. UT. 36 / 50* *SU. KA. 5 (24-27),(59-60) DALHANA*
	Kita Visha	*AS. UT. 43 / 12*
	Kita Kalpa	*SU. KA. 8 / 37*
	Visha chikitsita	*CHA. CHI. 23 / 9 , 39 , 155 , 210*
ENT	*Karna Roga*	*AH. UT. 18 / 43* *AS. UT. 22 / 15, 24, 41*
	Nasa Roga	*AS. UT. 24 / 30*
	Mukharoga	*SU. CHI. 22 / 6* *SU. CHI. 22 (59-66) DALHANA* *AH. UT. 22 / 5* *AS. UT. 26 / 5, 6*
	Shiroroga	*AH. UT. 24 / 21* *AS. UT. 28 / 13*
OPHTHALMOLOGY	*Timira*	*AH. UT. 13 / 82* *AS. UT. 16 / 23*
	Vartma Roga	*AH. UT. 24 / 21* *AS. UT. 28 / 13*
	Akshipaka Pilla	*AS. UT. 20 / 9*
	Abhishyanda	*AS. UT. 19 / 35*
	Sandhi Sita Asita roga	*AH. UT. 11 / 30* *AS. UT. 14 / 18*
	Nayanabhighata	*SU. UT. 19 (9-10) DALHANA*
	Raktabhishyanda	*SU. UT. 42 / 53*
	Drishtigata roga	*SU. UT. 17 / 54*
	Linganasha	*AS. UT. 17 / 14 , 15 , 18*
RESPIRATORY	*Rajayakshma*	*CHA. CHI. 8 / 82 ,* *AS. CHI. 7 (43) (SHASHILEKHA)* *AH. CHI. 5 (72)* *(SARVANGASUNDARI)(AYURVEDARASAYANAM)*
ANO RECTAL	*Guhya roga*	*AS. UT. 39 / 11 , 17*
	Arsha	*CHA. CHI. 14 / 61* *AH. CHI. 8 (29) (SARVANGASUNDARI)* *AS. CHI. 10 / 9,13*
PSCHYCHOLGICAL	*Apasmara*	*CHA. CHI. 10 / 40*
	Unmada	*AH. UT. 6 / 42*
SURGERY	*Vrana*	*AH. UT. 25 (26) (SARVANGASUNDARI)*
	Dvivrana	*SU. CHI. 1 / 29*
	Vidradhi	*SU. CHI. 16 / 12*
	Granthi (pittaja)	*SU. CHI. 18/ 8* *AH. UT. 30 / 3* *AS. UT. 35 / 4*
	Granthi (raktaja)	*AS. UT. 35 / 4*
	Vriddhi (Raktaja)	*SU. CHI. 19 / 11*
	Upadamsha	*SU. CHI. 19 / 25*
	Gulma	*SU.UT. 42 / 53*

	Prameha Pidaka	*SU. CHI. 12 (4)DALHANA*
PEDIATRICS	*Bala Roga*	*AH. UT. 2 / 75*
REPRODUCTIVE	*Vajikarana*	*AH. UT. 40 (80) (SARVANGASUNDARI)*

REFERENCE OF LEECH THERAPY IN MODERN TREATMENT APPROACHES

SYSTEM	**DISEASE**
ANO RECTAL	Non-suppurative abscess of natal cleft [11]
	Thrombosed piles [12]
	Prolapsed thrombosed piles [13]
	Thrombosed piles (post covid patient) [14]
DERMATOLOGY	Eczema [15]
	Psoriasis[16]
	Palmoplantar Psoriasis [17]
	Leukoderma [18]
	Vitiligo [19]
	Disseminated lymphadenosisbenigna cutis [20]
	Cellulitis of face [22]
	Acne vulgaris [23]
	Herpes zoster [24]
	Keloid [25]
	Pigment reduction in nevus of ota[26]
	Epidermoid cysts [27]
HAIR PROBLEM	Alopecia areata [28]
	Alopecia totalis [29]
	Folliculitis decalv0ans [30]
ENT	Ent bleeding and leech bite [31]
	Recurrent nasal vestibular furunculosis [32]
	Periorbital lacerations [33]
EYE	Recurrent anterior uveitis [34]
	External hordeolum [35]
ORTHO	Osteoarthritis [36]
	Degenerative knee [37]
DENTISTRY	Hirudotherapy in Dentistry [38]
	Element analysis of enamel surface before and after bleaching using three modes of activation [39]
	Quadriceps femoris tenosynovitis [40]
	Chronic lateral epicondylitis [41]
	Ankle sprain [42]
	Arthrosis of the first carpometacarpal joint [43]
CIRCULATORY	Post-thrombotic syndrome associated with chronic ulcer [44]
	Multiple varicose ulcers due to incompetent perforator veins in the lower limb (varicose veins) [45]

	Non-healing varicose ulcer [46]
	Non-healing ulcer [47]
	Diabetic foot ulcer [48]
	Venous congestion [49]
	Deep vein thrombosis (DVT). [50]
	Buerger's diseases [51]
	Atherosclerosis [52]
PLASTIC SURGERY	Increasing the flap viability: truth or myth? [53]
	Electrothermal ring burn [54]
NEUROLOGY	Periventricular leukomalacia - fungal mimicker in newborn brain [55]
	Neurocutaneous melanosis [56]
	Double meningomyelocele with hydrocephalus in a four-month infant [57]
ONCOLOGY	Bullous lesions, sweat gland necrosis and rhabdomyolysis in alcoholic coma [58]
ACCIDENT	A heterotopic digital replantation in an 18-month-old child [59]
	Necrosed index finger due to crush injury [60]
	Severe electrothermal ring burn [61]

DISCUSSION

Leech therapy has evolved significantly, transitioning from a bloodletting technique in ancient *Ayurvedic* medicine to a scientifically backed therapeutic modality. Classical texts like the *Sushruta Samhita* and *Charaka Samhita* highlight its role in *Raktamokshana* (blood purification) to treat aggravated *Pitta* and *Kapha* doshas conditions. Modern research has validated these traditional claims, demonstrating the biochemical and physiological benefits of leech saliva components, such as hirudin (anticoagulant) and eglins (anti-inflammatory agents).

Contemporary clinical applications of leech therapy span diverse fields, including dermatology, orthopaedics, and plastic surgery. For instance, its use in venous insufficiency and diabetic ulcers capitalizes on its ability to enhance microcirculation and reduce venous congestion. Similarly, its anti-inflammatory and analgesic properties effectively manage conditions like osteoarthritis and chronic wounds. Additionally, leech therapy's potential in cosmetic and reconstructive surgery, particularly for improving flap viability, showcases its versatility.

Despite its proven efficacy, challenges remain, including standardisation of therapeutic protocols, patient acceptance, and integration into mainstream medicine. Advances in research and increased awareness of its benefits are likely to propel leech therapy into broader clinical use. By blending ancient knowledge with modern science, *Jalaukavacharana* offers a unique, holistic approach to managing acute and chronic disorders, underscoring its potential as a valuable tool in integrative healthcare.

CONCLUSION

Leech therapy (*Jalaukavacharana*) bridges traditional *Ayurvedic* wisdom and modern medical science. Initially rooted in bloodletting to address vitiated *doshas*, this therapy has evolved into a scientifically validated treatment with diverse applications. The bioactive components in leech saliva, such as hirudin, calin, and hyaluronidase, have been shown to exert anticoagulant, anti-inflammatory, and vasodilatory effects, enhancing tissue healing and reducing venous congestion. Its utility in managing conditions like venous insufficiency, chronic wounds, osteoarthritis, and skin disorders underscores its therapeutic relevance. As research continues, leech therapy may gain broader acceptance in integrative medicine,

offering a unique, natural approach to health and healing.

REFERENCES

1. Mory Robert N, Mindell D, Bloom DA. The leech and the physician: biology, etymology and medical practice with Hirudinea medicinalis. World J Surg 2000; 878-883.
2. Kaviraj Ambikadutta Shastri: Part 1, Sutrasthana, Jalaukavacharaniya adhyaya of Sushruta Samhita of Maharishi Sushruta Edited with Ayurveda tatva sandipika, hindi commentary published by Chaukambha Sanskrit Sansthan, Varanasi, 13th edition. 13/9.
3. Prof.K.R.Shrikantha Murthy, Illustrated Sushruta Samhita Vol. I, reprint., Varanasi, Chaukhamba Orientalia, 2010,p.no. 80,81,82.
4. Dr Rajneesh V.Giri, Synopsis of Sushruta Samhita, reprint ed., Varanasi, Chaukhamba Orientalia, 2007, p. no. 31,32.
5. Kaviraj Ambikadutta Shastri: Part 1, Sutrasthana, Jalaukavacharaniya adhyaya of Sushruta Samhita of Maharishi Sushruta Edited with Ayurveda tatva sandipika, hindi commentary published by Chaukambha Sanskrit Sansthan, Varanasi, 13th edition. 13/6.
6. Andreas Michalsen, Manfred Roth, Gustav Dobos; Medicinal Leech Therapy, New York 2007; 132-138.
7. CH
8. SU
9. AS
10. AH
11. A case report on Raktamokshana in non-suppurative abscess of natal cleft (https://www.researchgate.net/publication/329180861_A_CASE_REPORT_ON_RAKTAMOKSHANA_IN_NON-SUPPURATIVE_ABSCESS_OF_NATAL_CLEFT)
12. A case study of thrombosed haemorrhoids treated with leech application (https://www.researchgate.net/publication/361926115_A_Case_Study_of_Thrombosed_Haemorrhoids_Treated_with_Leech_Application_and_orally_medication)
13. Effect of leech application in prolapsed thrombosed haemorrhoid: a case study (https://www.ijam.co.in/index.php/ijam/article/download/07422016/383)
14. A leech application in post-thrombosed haemorrhoids with increased D-dimer level - case study. (https://jaims.in/jaims/article/view/1380)
15. Comparative assessment of jalaukavacharana (leech application) and shringavacharana (horn application) in the management of vicharchika (https://www.ijam.co.in/index.php/ijam/article/view/104)
16. Anti-inflammatory effect of leech therapy in the patients of psoriasis (ek kustha) (https://www.jpsionline.com/articles/anti-inflammatory-effect-of-leech-therapy-in-the-patients-of-psoriasis-ek-kustha.pdf)
17. Role of leech therapy in vicharchika with special reference to palmoplantar psoriasis (pp): a case study. (https://www.researchgate.net/publication/320391033_ROLE_OF_LEECH_THERAPY_IN_VICHARCHIKA_WITH_SPECIAL_REFERENCE_TO_PALMO-PLANTAR_PSORIASIS_PPP_CASE_STUDY)
18. Application of leech therapy in the management of svitra (leukoderma) (https://www.researchgate.net/publication/313162131_Application_of_leech_therapy_in_the_management_of_Svitra_Leukoderma)
19. Efficacy of leech therapy and ayurvedic compound in vitiligo: a quasi-experimental study (https://www.researchgate.net/publication/270955184_Efficacy_of_Leech_therapy_and_Ayurvedic_compound_in_vitiligo_A_quasi_experimental_study)
20. Correspondence column: disseminated lymphadenitis benigna cutis (https://www.e-ijd.org/article.asp?issn=0019-5154;year=2006;volume=51;issue=1;spage=62;epage=63;aulast=Thomas)
21. Ayurveda management of cellulitis of the face: a case study (https://jaims.in/jaims/article/download/2711/3741/)
22. A clinical study to evaluate the efficacy of jalaukavacharana in managing Mukhadushika with special reference to acne vulgaris. (https://www.florajournal.com/archives/2017/vol5issue6/PartA/6-5-30-560.pdf)
23. Management of herpes zoster in Ayurveda through medicinal leeches and other composite Ayurveda treatments. (https://pmc.ncbi.nlm.nih.gov/articles/PMC7527853/)
24. Limitation of jalauka (medicinal leech) application in the prevention of recurrence of keloid: a case report (https://journals.lww.com/jras/fulltext/2023/07020/limitation_of_jalauka__medicinal_leech_.8.aspx)
25. Pigment reduction in nevus of ota following leech therapy (https://pmc.ncbi.nlm.nih.gov/articles/PMC4061587/)
26. Case report and literature review: leech therapy for epidermoid cysts and review of the literature (https://www.advbiores.net/article.asp?issn=2277-9175;year=2014;volume=3;issue=1;spage=112;epage=112;aulast=Rasi)
27. A persuasive in managing Indralupta (alopecia areata) with an ayurvedic approach. (https://www.researchgate.net/publication/344465255_A_persuasive_in_the_management_of_Indralupta_Alopecia_areata_with_Ayurvedic_approach)

28. An ayurvedic multimodular treatment of alopecia totalis (Khalitya) w.R.T panchakarma: a case report (https://www.researchgate.net/publication/339787528_International_Journal_of_Ayurveda_and_Pharma_Research_Case_Study_AN_AYURVEDIC_MULTIMODULAR_TREATMENT_OF_ALOPECIA_TOTALIS_KHALITYA_WRT_PANCHAKARMA_A_CASE_REPORT)
29. Management of folliculitis decalvans with Ayurveda- a case report. (https://pubmed.ncbi.nlm.nih.gov/36436296/)
30. Letter to the editor: ent bleeding and leech bite (https://www.advbiores.net/article.asp?issn=2277-9175;year=2013;volume=2;issue=1;spage=64;epage=64;aulast=Wiwanitkit)
31. Management of recurrent nasal vestibular furunculosis by jalaukavacharana and palliative treatment. (https://pubmed.ncbi.nlm.nih.gov/29269975/)
32. Role of leeches in peri-orbital lacerations healed by primary intention (https://www.ijam.co.in/index.php/ijam/article/view/07162016)
33. Ayurvedic management of recurrent anterior uveitis (raktaja adhimantha) with bloodletting therapy: a case report (https://journals.lww.com/jacr/fulltext/2021/04020/ayurvedic_management_of_recurrent_anterior_uveitis.5.aspx)
34. Case report: jalaukavacharana (leech) in Anjananamika (external hordeolum) (https://journals.lww.com/jism/abstract/2015/03010/jalukavacharan__leech__in_anjananamika__external.10.aspx)
35. Analgesic and anti-inflammatory effect of leech therapy (Jalaukavcharana) in the patients of osteoarthritis (Sandhigata vata) (https://www.irjponline.com/index.php/IRJP/article/view/1183)
36. Leech on the degenerative knee (https://www.researchgate.net/publication/271236217_Leech_on_the_degenerative_knee)
37. Clinical evaluation of leech therapy in the management of knee osteoarthritis: a pilot study (https://www.researchgate.net/publication/283759410_Clinical_evaluation_of_leech_therapy_in_the_management_of_knee_osteoarthritis_A_pilot_study)
38. Original article: element analysis of enamel surface before and after bleaching using three modes of activation (https://www.jdentlasers.org/article.asp?issn=2321-1385;year=2012;volume=6;issue=2;spage=57;epage=60;aulast=Sathe)
39. Effect of leech therapy in the management of quadriceps femoris tenosynovitis: a case study (https://www.researchgate.net/publication/271236051_Effect_of_leech_therapy_in_management_of_quadriceps_femoris_tenosynovitis_A_case_study)
40. Effectiveness of leech therapy in chronic lateral epicondylitis: a randomised controlled trial (https://journals.lww.com/clinicalpain/abstract/2011/06000/effectiveness_of_leech_therapy_in_chronic_lateral.9.aspx)
41. Role of jalaukavacharana (leech therapy) in the management of ankle sprain: a pilot study (https://paper.researchbib.com/view/paper/34923)
42. Effectiveness of leech therapy in women with symptomatic arthrosis of the first carpometacarpal joint: a randomised controlled trial (https://pubmed.ncbi.nlm.nih.gov/18407413/)
43. Jalaukavacharana (Hirudo therapy) in managing necrosed index fingers due to crush injury. (https://journals.lww.com/asol/fulltext/2018/38020/jalauk_vacarana__hirudo_therapy__in_the_management.6.aspx)
44. Ayurveda management of post-thrombotic syndrome associated with chronic ulcer- a case report. (https://www.aamjournal.in/?mno=110978)
45. Leech therapy for complicated varicose veins. (https://pubmed.ncbi.nlm.nih.gov/9701897/)
46. Management of non-healing varicose ulcer in Ayurveda (https://www.researchgate.net/publication/331672663_MANAGEMENT_OF_NON_HEALING_VARICOSE_ULCER_IN_AYURVEDA)
47. Non-healing ulcers treated with jalaukavacharana (bloodletting): a single case study. (https://www.jaypeedigital.com/doi/JRAS/pdf/10.5005/jp-journals-10064-0028)
48. Ayurvedic management of diabetic foot ulcer - a case report. (https://www.researchgate.net/publication/363485291_Ayurvedic_management_of_multiple_varicose_ulcers_due_to_incompetent_perforator_veins_in_lower_limb-A_case_report)
49. Evaluation of performance characteristics of the medicinal leech (Hirudo medicinalis) for treating venous congestion. (https://pubmed.ncbi.nlm.nih.gov/11786816/)
50. Management of deep vein thrombosis (DVT) by leech therapy: a case study (https://www.researchgate.net/publication/325674196_Management_of_Deep_Vein_ThrombosisDVTThrough_Leech_Therapy_A_case_Study)
51. Role of ayurvedic medicines and leech therapy in the management of buergers diseases - a case report (https://jahm.co.in/index.php/jahm/article/view/204)
52. Management of atherosclerosis through ayurveda - a case report (https://www.researchgate.net/publication/360040478_Management_of_multiple_sclerosis_through_Ayurveda_A_case_report)

53. Review article: increasing the flap viability: truth or myth? (http://www.turkjplastsurg.org/article.asp?issn=1300-6878;year=2020;volume=28;issue=2;spage=115;epage=119;aulast=Aksam)
54. Case report: a severe electrothermal ring burn case and a proposed treatment algorithm (http://www.turkjplastsurg.org/article.asp?issn=1300-6878;year=2022;volume=30;issue=3;spage=79;epage=81;aulast=Ozkan)
55. Letter to the editor: periventricular leukomalacia - fungal mimicker in the newborn brain: a case report with review of lit. (https://www.neurologyindia.com/article.asp?issn=0028-3886;year=2010;volume=58;issue=6;spage=951;epage=953;aulast=Gupta)
56. Letter to the editor: neurocutaneous melanosis: authors' reply (https://www.neurologyindia.com/article.asp?issn=0028-3886;year=2004;volume=52;issue=1;spage=127;epage=128;aulast=Karande)
57. Case report: a case of double meningomyelocele with hydrocephalous in a four-month infant (https://www.ayujournal.org/article.asp?issn=0974-8520;year=2016;volume=37;issue=1;spage=11;epage=17;aulast=Sharma)
58. E-and-case report: bullous lesions, sweat gland necrosis and rhabdomyolysis in alcoholic coma (https://www.e-ijd.org/article.asp?issn=0019-5154;year=2014;volume=59;issue=6;spage=632;epage=632;aulast=Asokan)
59. Case report: a heterotopic digital replantation in an 18-month-old child (http://www.turkjplastsurg.org/article.asp?issn=1300-6878;year=2018;volume=26;issue=4;spage=174;epage=176;aulast=Dadaci)
60. Jalaukavacharana (Hirudo therapy) in managing necrosed index fingers due to crush injury. (https://journals.lww.com/asol/fulltext/2018/38020/jalauk_vacarana__hirudo_therapy__in_the_management.6.aspx)
61. Case report: a severe electrothermal ring burn case and a proposed treatment algorithm (http://www.turkjplastsurg.org/article.asp?issn=1300-6878;year=2022;volume=30;issue=3;spage=79;epage=81;aulast=Ozkan)

Source of Support: Nil
Conflict of Interest: None Declared

How to cite this URL: Priyanka Ganguly et al: Concept of medicinal leech therapy or hirudotherapy in ayur-vedic and modern aspect. International Ayurvedic Medical Journal {online} 2025 {cited February 2025}