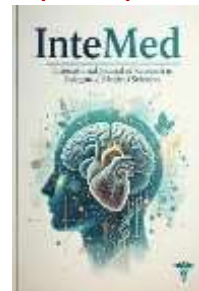




Intemed: International Journal of Research in Integrated Medical Sciences (IJ-RIMS)

Journal homepage: www.intemed.in

Vol.: 2 | Issue: 8 | August 2026



Article History: Received: 25-08-2026

Accepted: 27-08-2026

Published:30-08-2026

Review Article

Varicose Veins and Ayurveda: A Narrative Review of *Siravedha*, *Jalaukavacharana* and *Lepa* in Chronic Venous Disease

Dr. Sarang Sureshrao Ramdhare¹, Dr. Aapsing Gonya Vasave², Dr. Amit Vilas Doke³

¹ BAMS, MS (Shalyatantra), Associate Professor, Department of Shalyatantra, Government Ayurved College, Dharashiv, Maharashtra, India - 413501.

Email: drsarang100@gmail.com

² BAMS, MS (Shalyatantra), Deputy Medical Superintendent, KVTR Ayurved College & Lilai Hospital, Boradi, Ta-Shirpur, Dist-Dhule, Maharashtra, India - 425428.

Email: aapsingvasave1991@gmail.com

³ BAMS, MS (Shalyatantra), Deputy Medical Superintendent, Mahesh Ayurved College & Hospital, Ashti, Dist-Beed, Maharashtra, India - 414203.

Email: dramitmahrajdoke@gmail.com

Abstract

Varicose veins are a common form of chronic venous disease caused mainly by venous reflux and persistent venous hypertension. Although many patients first seek care because of visible veins, the condition may also cause aching, heaviness, edema, itching, skin pigmentation, bleeding, thrombophlebitis and venous ulceration. Duplex ultrasonography is central to diagnosis, while management may include lifestyle measures, compression, sclerotherapy, endovenous ablation or surgery, depending on the pattern and severity of disease. Ayurveda has no exact classical equivalent for modern varicose veins. The visible dilatation and tortuosity are often interpreted through *Siragranthi*, while pain, swelling, discoloration and chronic wounds may be considered through *Vata*, *Rakta*, *Sira Dushti* and *Vrana* concepts. This narrative review examines *Siravedha*, *Jalaukavacharana* and *Lepa* as possible adjuncts to established venous care. Small Ayurvedic studies report short-term improvement in symptoms, quality of life, inflammatory markers or ulcer features, but

the evidence is heterogeneous and cannot establish correction of valvular reflux or equivalence to endovenous treatment. Medicinal leeches have a clearer modern role in acute postoperative venous congestion than in uncomplicated chronic varicose veins. An integrative approach is most defensible when it preserves duplex-based assessment, compression and timely vascular referral while evaluating Ayurvedic procedures with standardized protocols, objective outcomes and careful safety monitoring.

Keywords: *Varicose veins; Chronic venous disease; Ayurveda; Siravedha; Jalaukavacharana; Lepa*

Abbreviations: AVVQ, Aberdeen Varicose Vein Questionnaire; CEAP, Clinical-Etiological-Anatomical-Pathophysiological; CIVIQ-20, Chronic Venous Disease Quality of Life Questionnaire; CVD, chronic venous disease; DUS, duplex ultrasonography; VCSS, Venous Clinical Severity Score.

INTRODUCTION

Varicose veins are dilated and tortuous superficial veins, most often seen in the lower limbs. They sit within the wider spectrum of chronic venous disease, which ranges from telangiectasia and reticular veins to edema, skin change and active ulceration. Prevalence estimates vary because studies use different populations and definitions, but the condition is common and its burden increases with age. [1]

The basic clinical problem is impaired venous return. Valve failure, reflux, obstruction or a weak calf-muscle pump can raise ambulatory venous pressure. Over time, this pressure affects the vein wall, microcirculation and surrounding tissue. Inflammation and extracellular-matrix remodeling add to the cycle of dilation and valve separation; varicose veins are therefore more than a cosmetic change. [2,3]

Two tools help describe the disease without confusing appearance with severity. The CEAP classification records clinical class, cause, anatomy and pathophysiology, whereas the VCSS is more responsive to change during follow-up. [4,5] These systems are useful in integrative research because a patient with visible C2 veins is clinically different from a patient with edema, skin damage or an active ulcer.

Ayurvedic practice offers a different conceptual language. The enlarged, uneven course of superficial veins is commonly discussed in relation to *Siragranthi*. Pain, swelling, discoloration and ulceration may also be considered through *Vata*, *Rakta*, *Sira Dushti* and *Vrana*. These correlations can support clinical reasoning, but they should not be presented as exact translations of venous anatomy or valve failure.

SCOPE OF THE REVIEW

This narrative review brings together current vascular guidelines, major clinical trials in chronic venous disease, literature on medicinal leeches, classical Ayurvedic sources and selected Ayurvedic clinical studies available through August 2026. The review focuses on lower-limb varicose veins and related venous ulcers, with particular attention to *Siravedha*,

Jalaukavacharana and *Lepa*. Ayurvedic evidence is discussed separately from established vascular evidence because the interventions, study designs and outcome measures are not directly comparable.

MODERN CLINICAL FRAMEWORK

Clinical presentation and assessment

Patients may report aching, heaviness, throbbing, itching, night cramps, swelling or fatigue that becomes worse after standing. Examination should document the distribution of veins, edema, skin pigmentation, eczema, lipodermatosclerosis, healed or active ulceration, arterial pulses and signs of thrombosis. Symptoms alone do not identify the refluxing vein, and visible varicosities do not reliably show whether disease is superficial, perforator-related, deep or post-thrombotic.

Duplex ultrasonography is the main investigation for mapping venous anatomy, reflux and obstruction. Reflux should be measured with a standardized technique and interpreted in the clinical context rather than from an isolated Doppler finding. [6] Current North American and European guidelines place duplex assessment at the centre of decisions about truncal reflux, tributaries, recurrence and intervention. [7,8,9] NICE likewise recommends duplex imaging to confirm the diagnosis and plan treatment, while the 2025 SCAI guideline emphasizes individualized care across the chronic venous disease spectrum. [10,11]

Table 1. Clinical Cases of chronic venous disease and their practical significance

CE AP clas s	Typical finding	Clinical implication
C0	No visible or palpable venous signs	Symptoms require evaluation for venous and non-venous causes.

CE AP clas s	Typical finding	Clinical implication
C1	Telangiectasia or reticular veins	Usually mild disease; treatment is often symptom- or appearance-led.
C2	Varicose veins	Document symptoms and reflux anatomy before invasive treatment.
C3	Edema	Exclude cardiac, renal, lymphatic, medication-related and thrombotic causes.
C4	Pigmentation, eczema, lipodermatosclerosis, atrophie blanche or corona phlebectatica	Indicates tissue effects of chronic venous hypertension and needs active follow-up.
C5	Healed venous ulcer	High recurrence risk; compression and reflux management remain important.
C6	Active venous ulcer	Requires wound care, compression when arterial supply is adequate, and timely vascular assessment.

CEAP should be combined with symptoms, duplex findings and an evaluative score such as VCSS; it is not a stand-alone treatment algorithm. [4,5,7,8,9]

Established management

Management depends on the patient's symptoms, CEAP class, arterial status, reflux pattern, previous thrombosis, general health and preference. Walking, calf-muscle activity, weight management, leg elevation and avoidance of long immobile standing can reduce symptom burden. Compression is useful

for many patients, but fit, pressure, adherence and arterial sufficiency matter.

For symptomatic superficial truncal reflux, treatment may include endovenous thermal ablation, non-thermal closure, ultrasound-guided foam sclerotherapy, phlebectomy or surgery. Randomized evidence shows that endovenous laser ablation, foam sclerotherapy and surgery can all improve disease-specific quality of life, although durability, recurrence, recovery and adverse-effect profiles differ. [12,13] In venous ulcer disease, early treatment of superficial reflux in addition to compression can accelerate healing, and compression remains a foundation of care when arterial supply is adequate. [14,15,16] Earlier surgical evidence also showed that correcting superficial reflux reduced ulcer recurrence when added to compression. [17]

The practical lesson for an integrative service is simple: a supportive therapy should not delay duplex-based diagnosis or definitive treatment when reflux is clinically important. This is especially relevant in active bleeding, recurrent superficial thrombosis, progressive skin damage and venous ulceration.

The symptom burden is still worth treating even when intervention is not immediately required. Population studies show that pain, heaviness, swelling and cosmetic concern can affect daily activity and quality of life. [18] Age, pregnancy, family history, body mass index, previous thrombosis and prolonged standing are commonly reported risk factors, although their strength and independence vary among studies. [19]

AYURVEDIC INTERPRETATION

Ayurveda does not contain a single classical label that is identical to modern varicose veins. *Siragranthi* offers a useful structural correlation because it describes abnormal enlargement or nodular change involving *Sira*. The traditional rationale for bloodletting is drawn mainly from descriptions of *Rakta*, *Sira*, *Raktamokshana*, *Siravedha*, leech application and wound care in the *Sushruta Samhita*. [20] The *Ashtanga Hridaya* also discusses *Siragranthi* and *Siravyadha*, while the *Charaka Samhita* provides broader concepts related to *Rakta Dushti* and *Vrana*. [21,22]

A cautious clinical interpretation is preferable to a literal translation. *Vata* may be used to discuss pain, altered movement and progression; *Rakta* and *Sira Dushti* may frame congestion, discoloration or local tissue change; and *Vrana* concepts are relevant once ulceration occurs. None of these concepts demonstrates the location or duration of reflux. Duplex findings and arterial assessment must therefore remain independent clinical data.

Table 2. A cautious comparison of modern and Ayurvedic clinical frameworks

Modern feature	Ayurvedic concept	Defensible use	Important limit
Treatment selection	<i>Dosha</i> , tissue state and procedure suitability	May individualize supportive care	Must not override contraindications, compression needs or referral

Modern feature	Ayurvedic concept	Defensible use	Important limit
Dilated, tortuous superficial vein	<i>Siragranti</i>	A structural and clinical correlation	Not proof of identical pathology or valve failure
Pain, cramps and altered function	<i>Vata</i> involvement	A way to organize symptom pattern	Does not replace neurological, arterial or thrombotic assessment
Congestion, discoloration and tissue change	<i>Rakta</i> and <i>Sira Dushti</i>	Traditional rationale for local measures and <i>Raktamokshana</i>	Cannot identify refluxing segments
Venous eczema or ulcer	<i>Vrana</i> and <i>Dushta Vrana</i>	Supports wound-focused assessment and local care	Venous, arterial, diabetic and infective causes still require modern evaluation

SIRAVEDHA

Siravedha is controlled venesection described within *Shalyatantra*. In contemporary varicose-vein practice, its proposed purpose is to reduce localized fullness or congestion and to relieve symptoms associated with disturbed *Rakta* and *Vata*. A temporary reduction in local venous volume is plausible, but the procedure cannot mechanically restore an incompetent saphenous valve. Any reported benefit should therefore be described as symptomatic, local or short term unless duplex measurements show otherwise.

Kartha and colleagues studied 30 patients and reported improvement in CEAP, VCSS and quality-of-life measures after *Siravedha*.^[23] A later five-patient study measured interleukin-6 before and after repeated *Siravyadha* and reported reductions in the biomarker together with improvement in several symptoms.^[24] These studies are useful for generating hypotheses, but small samples, short follow-up and absence of a robust control group limit causal interpretation.

Other Ayurvedic studies have compared *Siravyadha* with *Basti*, or with endovenous laser ablation, and a 2026 report compared *Siravedha* with *Jalaukavacharana*.^[25,26,27] These publications show growing interest in objective comparison, yet they do not justify a claim of equivalence to endovenous ablation. Differences in CEAP stage, reflux anatomy, procedural technique, co-interventions and follow-up make broad conclusions unsafe. Literature reviews of *Siravedha* also stress the importance of indications,

contraindications and correct procedure rather than casual bloodletting. [28]

Safety screening should include bleeding history, hemoglobin, platelet status, anticoagulant and antiplatelet use, infection risk and the patient's ability to tolerate blood loss. Aseptic technique, documented blood volume and post-procedure observation are essential. Sudden unilateral swelling, suspected deep-vein thrombosis or arterial insufficiency are reasons for medical assessment, not immediate venesection.

JALAUKAVACHARANA

Jalaukavacharana uses medicinal leeches for localized blood removal. Its physiology is easier to relate to modern evidence than that of many traditional procedures: the leech removes blood directly, salivary compounds inhibit coagulation and platelet activity, and continued oozing provides temporary local drainage. Reviews of reconstructive practice describe these combined effects in compromised tissue with venous congestion. [29]

The strongest modern evidence is in acute postoperative venous congestion of flaps and replanted tissue, where leeches can bridge the period until venous outflow improves. A systematic review of 277 reported cases supports this reconstructive indication, although the underlying evidence is mostly observational. [30] General reviews also describe hirudin, calin and other salivary substances with anticoagulant, vasodilatory and anti-inflammatory actions. [31] A separate review comparing Western, Persian and Indian traditions found potential relevance to venous congestion and ulcer care but emphasized limited evidence for chronic wound indications. [32] A 2024 systematic review of clinical trials reached a broadly positive conclusion across several conditions, but marked heterogeneity limits condition-specific certainty. [33]

This evidence boundary matters. Acute congestion in a surgical flap is not the same disease as chronic lower-limb reflux. It would be misleading to transfer the reconstructive evidence directly to uncomplicated C2 varicose veins. In chronic disease, *Jalaukavacharana* should be studied as a localized

adjunct, with duplex findings, CEAP class and standard care reported clearly.

Safety of medicinal leeches

Prolonged bleeding, anemia, local reactions and infection are the main concerns. Medicinal leeches carry *Aeromonas* species as gut symbionts, and infections ranging from cellulitis to sepsis have been reported. [34,35] Antimicrobial resistance is also possible; a multidrug-resistant infection led one centre to develop a combined stewardship and infection-prevention protocol. [36] Any clinical use should therefore follow institutional policy for species and source verification, storage, single-patient use, disposal, bite-site care, blood-count monitoring and antimicrobial advice. Diabetes, immunosuppression, ulcer infection and concurrent anticoagulation require particular caution.

LEPA AND LOCAL SKIN CARE

Lepa is a topical preparation made from specified ingredients and a suitable medium. In chronic venous disease, it may be chosen for local discomfort, itching, swelling or skin irritation. The term should never be treated as a single drug: each formulation has its own botanical identity, concentration, preparation method, stability, microbial quality and allergy risk.

A topical preparation may have a soothing, astringent or anti-inflammatory effect, but it cannot correct truncal reflux. Application over eczematous or ulcerated skin also raises safety questions that do not arise on intact skin. Studies must state the full formulation, plant parts, proportions, vehicle, contact time, application frequency and wound-care co-interventions. Products should not be applied over an infected wound without appropriate assessment.

EVIDENCE IN VENOUS ULCERS

Ayurvedic clinical interest is greater in venous ulcers than in uncomplicated varicosities. Tuppad and Shilpa randomized 40 patients with *Dushta Vrana* associated with varicose ulcers and reported improvement in both groups receiving *Jalaukavacharana*, with additional benefit in several

wound parameters when *Vimlapana Karma* was added. [37] Reena and Jaiswal compared *Siravyadhana* and *Jalaukavacharana* used with *Trishothadi Lepam* in foot ulcers and reported better overall healing in the leech-treated group. [38]

These findings are encouraging but need careful reading. The studies involve small samples, mixed wound contexts, several simultaneous interventions and short follow-up. They do not remove the need for compression, arterial assessment, infection control, glycemic management or reflux treatment. The strongest next study would test the added value of a standardized Ayurvedic intervention on top of—not instead of—evidence-based ulcer care.

Table 3. Clinical role and evidence limits of the three Ayurvedic interventions

Intervention	Possible adjunctive role	Current evidence	Main limitation
<i>Siravedha</i>	Controlled venesection for selected symptomatic patients	Small exploratory and comparative studies report short-term symptomatic score or biomarker change	Does not repair valves; bleeding and anemia risk; long-term reflux outcomes uncertain
<i>Jalaukavacharana</i>	Localized blood removal and temporary drainage	Established physiological rationale in acute surgical venous congestion; limited chronic venous and ulcer studies	Chronic reflux is not equivalent to flap congestion; infection and prolonged bleeding require protocols

Intervention	Possible adjunctive role	Current evidence	Main limitation
<i>Lepa</i>	Supportive care for selected local skin symptoms	Formulation-specific evidence is sparse; sometimes used within multi-component ulcer care	Cannot correct reflux; standardization, allergy, contamination and wound safety must be addressed

AN INTEGRATIVE CLINICAL POSITION

An integrative pathway begins with diagnosis rather than procedure selection. A patient with mild aching and C2 veins may need education, activity advice and duplex assessment before deciding on treatment. A patient with edema, skin change or ulceration needs a broader evaluation. *Siravedha*, *Jalaukavacharana* or *Lepa* may be considered only after the clinical purpose is clear: symptom relief, local wound support or research participation.

Urgent referral is required for suspected deep-vein thrombosis, sudden unilateral swelling, pulmonary embolism symptoms, active bleeding, rapidly spreading infection, severe rest pain, limb ischemia or a rapidly worsening ulcer. Recurrent superficial thrombosis, progressive skin change and persistent ulceration also need vascular review. Ayurveda should complement timely care, not create a delay.

Compression should not be withheld merely because a local Ayurvedic procedure is being used. The most ethical ulcer trial would compare standard wound care and clinically appropriate compression with the same treatment plus a standardized Ayurvedic intervention. This design answers the practical question: does the adjunct add meaningful benefit without increasing harm?

Domain	Recommended measure	Timing	Why it matters
Disease definition	CEAP class, symptoms, duplex reflux and obstruction	Baseline	Prevents unlike venous conditions from being analysed together
Clinical severity	VCSS, pain, heaviness, edema and skin findings	Baseline and each follow-up	Shows whether change is clinically relevant
Quality of life	AVVQ or CIVIQ-20	Baseline, end of treatment and later follow-up	Captures benefit that matters to patients
Duplex outcome	Reflux duration, target-vein diameter and patency	Baseline and prespecified follow-up	Tests whether benefit extends beyond symptoms
Ulcer outcome	Area, percentage reduction, healing time, recurrence and infection	Serial measurement for C6 disease	Allows comparison with modern wound trials
Safety and process	Blood loss, hemoglobin, bleeding, infection, allergy, co-interventions and protocol adherence	Every treatment visit	Makes harms and treatment reproducibility visible

RESEARCH PRIORITIES

Future trials should recruit clearly defined populations, such as symptomatic CEAP C2-C3

disease or venous ulcers with documented superficial reflux. Participants with acute thrombosis, important arterial insufficiency or uncontrolled infection should be identified before enrolment. Randomization, assessor blinding where feasible, prospective registration and a prespecified adverse-event plan would improve credibility.

Patient-reported outcomes should be paired with objective measures. The AVVQ was developed specifically for varicose veins, while CIVIQ-20 measures the quality-of-life burden of chronic venous disease across several domains. [39,40] VCSS, edema measurement, duplex reflux duration and vein diameter can add clinical context. For ulcers, wound area, percentage area reduction, healing time, recurrence, infection and compression adherence could be reported.

Table 4. Minimum outcome set for future integrative studies

DISCUSSION

The source traditions and modern vascular science ask different questions. Modern assessment identifies reflux, obstruction, clinical class and the need for intervention. Ayurvedic assessment organizes the patient's presentation through *Dosha*, *Rakta*, *Sira* and wound concepts, then selects local or para-surgical measures. A useful integrative review respects both frameworks while being clear about what each can and cannot establish.

The present evidence suggests possible short-term symptom or wound benefits from *Siravedha* and *Jalaukavacharana*, but certainty remains low. The studies are small, procedures are not standardized, and long-term duplex or recurrence data are rare. *Lepa* is even more formulation-dependent and should be described as supportive local care. The strongest claim that can currently be made is that these approaches deserve careful adjunctive investigation—not that they replace endovenous treatment, compression or vascular surgery.

This distinction also protects Ayurveda from overstatement. If future trials show that a procedure reduces pain, improves quality of life or accelerates ulcer healing when added to standard care, that would be clinically useful even if the underlying reflux remains unchanged. Clear endpoints and honest limitations will make such findings more credible.

CONCLUSION

Varicose veins are a manifestation of chronic venous disease driven mainly by reflux and venous hypertension. Duplex ultrasonography, CEAP classification and established vascular treatment remain central to care. Ayurveda offers a complementary clinical perspective through *Siragranthi*, *Vata*, *Rakta*, *Sira Dushti* and *Vrana*.

Siravedha and *Jalaukavacharana* have plausible local effects and preliminary clinical evidence, while *Lepa* may support selected skin symptoms. None should be assumed to correct valvular incompetence. Medicinal leeches also require a clear distinction between their accepted use in acute surgical venous congestion and their still-limited evidence in chronic varicose disease.

The most responsible way forward is an adjunctive model: retain compression, wound care, duplex assessment and timely referral, then test standardized Ayurvedic procedures with validated patient-reported outcomes, objective vascular measures, long-term follow-up and rigorous safety monitoring.

REFERENCES

- Robertson L, Evans C, Fowkes FGR. Epidemiology of chronic venous disease. *Phlebology*. 2008;23(3):103-111. doi:10.1258/phleb.2007.007061.
- Eberhardt RT, Raffetto JD. Chronic venous insufficiency. *Circulation*. 2014;130(4):333-346. doi:10.1161/CIRCULATIONAHA.113.006898.
- Jacobs BN, Andraska EA, Obi AT, Wakefield TW. Pathophysiology of varicose veins. *J Vasc Surg Venous Lymphat Disord*. 2017;5(3):460-467. doi:10.1016/j.jvsv.2016.12.014.
- Lurie F, Passman M, Meisner M, Dalsing M, Masuda E, Welch H, et al. The 2020 update of the CEAP classification system and reporting standards. *J Vasc Surg Venous Lymphat Disord*. 2020;8(3):342-352. doi:10.1016/j.jvsv.2019.12.075.
- Vasquez MA, Rabe E, McLafferty RB, Shortell CK, Marston WA, Gillespie D, et al. Revision of the Venous Clinical Severity Score: venous outcomes consensus statement. *J Vasc Surg*. 2010;52(5):1387-1396. doi:10.1016/j.jvs.2010.06.161.
- Labropoulos N, Tiongson J, Pryor L, Tassiopoulos AK, Kang SS, Ashraf Mansour M, et al. Definition of venous reflux in lower-extremity veins. *J Vasc Surg*. 2003;38(4):793-798. doi:10.1016/S0741-5214(03)00424-5.
- Gloviczki P, Lawrence PF, Wasan SM, Meissner MH, Almeida J, Brown KR, et al. The 2022 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part I. *J Vasc Surg Venous Lymphat Disord*. 2023;11(2):231-261.e6. doi:10.1016/j.jvsv.2022.09.004.
- Gloviczki P, Lawrence PF, Wasan SM, Meissner MH, Almeida J, Brown KR, et al. The 2023 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part II. *J Vasc Surg Venous Lymphat Disord*. 2024;12(1):101670. doi:10.1016/j.jvsv.2023.08.011.
- De Maeseneer MG, Kakkos SK, Aherne T, Baekgaard N, Black S, Blomgren L, et al. European Society for Vascular Surgery 2022 clinical practice guidelines on the management of chronic venous disease of the lower limbs. *Eur J Vasc Endovasc Surg*. 2022;63(2):184-267. doi:10.1016/j.ejvs.2021.12.024.
- National Institute for Health and Care Excellence. Varicose veins: diagnosis and management. Clinical guideline CG168. London: NICE; 2013.
- Attaran RR, Edwards ML, Arena FJ, Bunte MC, Carr JG, Castro-Dominguez Y, et al. 2025

- SCAI clinical practice guidelines for the management of chronic venous disease. *J Soc Cardiovasc Angiogr Interv.* 2025;4(8):103729. doi:10.1016/j.jscai.2025.103729.
12. Brittenden J, Cotton SC, Elders A, Ramsay CR, Norrie J, Burr JM, et al. A randomized trial comparing treatments for varicose veins. *N Engl J Med.* 2014;371(13):1218-1227. doi:10.1056/NEJMoa1400781.
 13. Brittenden J, Cooper D, Dimitrova M, Scotland G, Cotton SC, Elders A, et al. Five-year outcomes of a randomized trial of treatments for varicose veins. *N Engl J Med.* 2019;381(10):912-922. doi:10.1056/NEJMoa1805186.
 14. Gohel MS, Heatley F, Liu X, Bradbury A, Bulbulia R, Cullum N, et al. A randomized trial of early endovenous ablation in venous ulceration. *N Engl J Med.* 2018;378(22):2105-2114. doi:10.1056/NEJMoa1801214.
 15. O'Meara S, Cullum N, Nelson EA, Dumville JC. Compression for venous leg ulcers. *Cochrane Database Syst Rev.* 2012;(11):CD000265. doi:10.1002/14651858.CD000265.pub3.
 16. Shi C, Dumville JC, Cullum N, Connaughton E, Norman G. Compression bandages or stockings versus no compression for treating venous leg ulcers. *Cochrane Database Syst Rev.* 2021;7(7):CD013397. doi:10.1002/14651858.CD013397.pub2.
 17. Barwell JR, Davies CE, Deacon J, Harvey K, Minor J, Sassano A, et al. Comparison of surgery and compression with compression alone in chronic venous ulceration: randomised controlled trial. *Lancet.* 2004;363(9424):1854-1859. doi:10.1016/S0140-6736(04)16353-8.
 18. Bradbury A, Evans C, Allan P, Lee A, Ruckley CV, Fowkes FGR. What are the symptoms of varicose veins? Edinburgh Vein Study cross-sectional population survey. *BMJ.* 1999;318(7180):353-356. doi:10.1136/bmj.318.7180.353.
 19. Aslam MR, Muhammad Asif H, Ahmad K, Jabbar S, Hayee A, Sagheer MS, et al. Global impact and contributing factors in varicose vein disease development. *SAGE Open Med.* 2022;10:20503121221118992. doi:10.1177/20503121221118992.
 20. Sushruta. *Sushruta Samhita* with Nibandhasangraha commentary of Dalhana. Acharya YT, Acharya NR, editors. Reprint ed. Varanasi: Chaukhambha Sanskrit Sansthan; 2017. Sutra Sthana 13, Sharira Sthana 8 and Chikitsa Sthana 1.
 21. Vagbhata. *Ashtanga Hridaya* with Sarvangasundara commentary of Arunadatta and Ayurvedarasayana commentary of Hemadri. Kunte AM, Navre KR, Paradakara HS, editors. Reprint ed. Varanasi: Chaukhambha Surbharati Prakashan; 2016. Relevant descriptions of Siragranthi and Siravyadha.
 22. Agnivesha. *Charaka Samhita*, revised by Charaka and Dridhabala, with Ayurveda Dipika commentary of Chakrapanidatta. Acharya YT, editor. Reprint ed. Varanasi: Chaukhambha Surbharati Prakashan; 2016. Sutra Sthana 24 and Chikitsa Sthana 25.
 23. Kartha JR, Abhilash M, Umesh P, Ajitha K. Effect of Siravedha in varicose vein: an exploratory data analysis and modelling. *Ann Ayurvedic Med.* 2021;10(4):370-386. doi:10.5455/AAM.50491.
 24. Sivadas AS, Vikraman AI, Santharajan V, Balakrishnan KP, Unnikrishnan V, Namboothiri PK. Estimation of the inflammatory biomarker IL-6 in blood samples from varicose veins after repeated Siravyadha. *Front Med (Lausanne).* 2025;12:1638127. doi:10.3389/fmed.2025.1638127.
 25. Mashetti NB, Dagu MB, Baragi UC. To evaluate the efficacy of Siravyadha and Basti in the management of Siraja Granthi: a comparative clinical study. *J Ayurveda Integr Med Sci.* 2017;2(5):40-46. doi:10.21760/jaims.v2i05.10252.
 26. Wani PB. Comparative clinical study of Siravedhana using 24G needle versus endovenous laser ablation in the management of lower limb varicose veins. *Int J Community Med Public Health.* 2026;13(3):1333-1337. doi:10.18203/2394-6040.ijcmph20260689.
 27. Shankar H, Dixit M, Soni RK, Lal C. Comparative study of Jalaukavacharana and Siravedha in the management of varicose veins.

- World J Pharm Sci Res. 2026;5(6):14-18. doi:10.5281/zenodo.20443153.
28. Choudhary NR, Hemantha Kumar P. Siravedha: a literary review. *Int J Appl Ayurved Res.* 2018;3(7):1113-1116.
29. Mousavian A, Sabzevari S, Parsazad S, Moosavian H. A comprehensive review of medicinal leeches in plastic and reconstructive surgery. *Plast Reconstr Surg Glob Open.* 2020;8(12):e2555. doi:10.1097/GOX.0000000000002555.
30. Whitaker IS, Oboumarzouk O, Rozen WM, Naderi N, Balasubramanian SP, Azzopardi EA, et al. The efficacy of medicinal leeches in plastic and reconstructive surgery: a systematic review of 277 reported clinical cases. *Microsurgery.* 2012;32(3):240-250. doi:10.1002/micr.20971.
31. Sig AK, Guney M, Uskudar Guclu A, Ozmen E. Medicinal leech therapy: an overall perspective. *Integr Med Res.* 2017;6(4):337-343. doi:10.1016/j.imr.2017.08.001.
32. Koeppen D, Aurich M, Pasalar M, Rampp T. Medicinal leech therapy in venous congestion and various ulcer forms: perspectives of Western, Persian and Indian medicine. *J Tradit Complement Med.* 2020;10(2):104-109. doi:10.1016/j.jtcme.2019.08.003.
33. Hosseini M, Jadidi A, Derakhshan Barjoei MM, Salehi M. Applications of leech therapy in medicine: a systematic review. *Front Med (Lausanne).* 2024;11:1417041. doi:10.3389/fmed.2024.1417041.
34. Clark NM, Femino JE, Chenoweth CE. *Aeromonas* infection after medicinal leech therapy: case reports and review of the literature. *Infect Dis Clin Pract.* 2001;10(4):211-218. doi:10.1097/00019048-200105000-00007.
35. Maetz B, Abbou R, Andreoletti JB, Bruant-Rodier C. Infections following the application of leeches: two case reports and review of the literature. *J Med Case Rep.* 2012;6:364. doi:10.1186/1752-1947-6-364.
36. Masters MC, Gupta AR, Rhodes NJ, Raineri E, Dever LL, Sikka MK. Multidrug-resistant *Aeromonas* infection following medical leech therapy: a case report and development of a joint antimicrobial stewardship and infection prevention protocol. *J Glob Antimicrob Resist.* 2020;23:349-351. doi:10.1016/j.jgar.2020.10.010.
37. Tuppad V, Shilpa PN. Clinical trial to evaluate the add-on effect of Vimlapana Karma in Dushta Vrana with special reference to varicose ulcer: a randomised controlled trial. *J Ayurveda Integr Med Sci.* 2025;9(12):16-27. doi:10.21760/jaims.9.12.3.
38. Reena, Jaiswal DD. Comparative study on the effect of Siravyadhana and Jalaukavacharana along with Trishothadi Lepam on foot ulcers. *J Indian Syst Med.* 2018;6(3):122-129. doi:10.5005/JISM-11051-06304.
39. Garratt AM, Macdonald LM, Ruta DA, Russell IT, Buckingham JK, Krukowski ZH. Towards measurement of outcome for patients with varicose veins. *Qual Health Care.* 1993;2(1):5-10. doi:10.1136/qshc.2.1.5.
40. Launois R, Mansilha A, Jantet G. International psychometric validation of the Chronic Venous Disease Quality of Life Questionnaire (CIVIQ-20). *Eur J Vasc Endovasc Surg.* 2010;40(6):783-789. doi:10.1016/j.ejvs.2010.03.034.