International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 7 Issue 5, September-October 2023 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Jalaukavacharana (Medicinal Leech Therapy) - A Scientific Review in Ayurveda and Biomedicine

Dr. Sonia Shekhawat[1], Dr. Devesh Shukla[2], Dr. Rajeev Kumar[3], Dr. Jeeshan Khan[4]

[1]PG Scholar, Shalya Tantra Department, Gurukul Campus, Haridwar,
[2]Associate Professor, Shalya Tantra Department, Gurukul Campus, Haridwar,
[3]Assistant Professor, Shalya Tantra Department, Gurukul Campus, Haridwar,
[1, 2, 3]Uttarakhand Ayurveda University, Dehradun, Uttarakhand, India
[4]PG Scholar, Rachana Sharir Department, Shri Krishna Government Ayurvedic College, Shri Krishna Ayush University, Kurukshetra, Haryana, India

ABSTRACT

Hirudotherapy, also known as medicinal leech therapy, has been used for thousands of years to treat a wide range of medical and surgical disorders. *Sushruta Samhita*, the oldest available manual on surgery, devoted an entire chapter to the description of *Jalaukas* in the chapter *Jalaukavacharaniya adhyaya* for the purpose of bloodletting. *Jalaukavacharana* is claimed to be the supreme therapy because of its safety and high efficacy in the disorders involving the vitiation of *Rakta* and *Pitta doshas* and toxins that accumulate in the body. Bioactive substances present in the leech saliva also exert a therapeutic effect on several diseases. Though most people dislike them, medicinal leeches can be of quite beneficial and can help people overcome a variety of illness. So, with modern prospective an attempt is made to understand the mode of action of bioactive substances produced by *Jalauka*.

KEYWORDS: *Jalaukavacharana, Hirudotherapy, Jalauka, Medicinal leech therapy*

How to cite this paper: Dr. Sonia Shekhawat | Dr. Devesh Shukla | Dr. Rajeev Kumar | Dr. Jeeshan Khan "*Jalaukavacharana* (Medicinal Leech Therapy) - A Scientific Review in Ayurveda and Biomedicine" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-7 | Issue-5, October 2023, pp.481-485, URL: www.ijtsrd.com/papers/ijtsrd59955.pdf

IJTSRD59955

INTRODUCTION

Globally there are more than 700 leech spieces out of which the most frequently used spieces for therapeutic purposes were *Hirudo medicinalis, H. verbana, H. manillensis, Haementaria ghillanii, Macrobdella decora, Haementaria officionalis, Hirudotroctina, Hirudo quinquestriata, H. nipponia, Poecilobdella granulose* and *Hirudinaria javanica. Hirudo medicinalis* is the leech used most commonly in Europe whereas *Hirudinaria manillensis* is the most commonly used leech in the Asian region. *Haementaria ghillanii* is the Amazonian medicinal leech and *Macrobdella decora* is the north American medicinal leech. *Haementaria officionalis* is a medicinal leech found in Mexico. A specimen of *Hirudo verbena* was first observed in the Stracos valley, in the Tasad Reserve (Bihor country, north-western Romania). The Food and Drug organisation (FDA) approved the use of leeches for medicinal purposes in 2004. The most commonly used leech is the European medicinal leech spieces, *Hirudinaria medicinalis*.

TABLE: 1 ENZYMES AND CHEMICALS SECRETED BY LEECH SALIVA

S. No.	ENZYMES/CHEMICAL	ACTION
1	Hirudin	It is a powerful anticoagulant; it inhibits blood coagulation by preventing conversion of fibrinogen to fibrin.
2.	Calin	inhibit blood coagulation
3.	Hyaluronidase	It is a spreading agent that ensures that the other active substances which are effective at the bitten areas can be spread.
4.	Eglins	Restrains digestive proteases
5.	Bdellin	Antiphlogistic, antibiotics
6.	Destabilase	Dissolves fibrin and has thrombolytic effects
7.	Eglins Factor XA Inhibitor	Inhibits the activity of coagulation factor XA
8.	Compliment Inhibitors	Replace natural complement Inhibitors if they are deficient
9.	Carboxy peptidase A inhibitors	Increase the inflow of blood
10.	Acetyl Choline	Vasodilator
11.	Anaesthetic like substance	Reduces pain during the biting of leech
12.	Chloromycetyn	Potent antibiotic
13.	Histamine like substances	Vasodilator that increases blood flow to the bite site
14.	Tryptase inhibitors	Inhibit proteolytic enzymes of host mast cells
15.	Hirustasin	Inhibits kallikrein, trypsin and chymotrypsin
16.	Collagenase	Facilitates tissue penetration
17.	Apyrase	Inhibitor of platelet aggregation by inhibition of adenosine triphosphatase

MODE OF ACTION OF LEECH SALIVA:

Jalauka acts in two ways:

1. by injecting bioactive substances through its saliva and
2. by sucking blood.

A medicinal leech is a small factory to manufacture biologically active substances that have the following actions -

1. Normalization and improvement of capillary circulation
2. Vasodilator
3. Corrects venous hypertension
4. Anticoagulation effect
5. Anti-inflammatory effect
6. Blood purification by expelling out the vitiated blood
7. Endo cellular exchange enhancement
8. Early wound healing effect
9. Local anesthetic effect
10. Antibacterial effect
11. Angiogenesis

ZOOLOGICAL CLASSIFICATION OF LEECH (*JALAUKA*):

1. Scientific name – *Hirudo medicinalis*
2. Phylum – *Annelida*
3. Order – *Arynchobdellida*
4. Family – *Hirudinidae*
5. Class – *Clitellata*
6. Kingdom - *Animalaia*
7. Habitat – Water
8. *Rasa – Madhura*

ABOUT LEECH:

The temperature suitable for survival of leeches ranged between 0^0C-30^0C. Like other water leeches were also sensitive to rapid changes in temperature. For therapeutic purpose in leech farming, it is recommended by FDA that the animal must be maintained without feeding at a temperature range of 4^0 C to 13^0 C and water volume area per animal should not be less than .7L, with typically 10-15 leeches being held in a large jar. Leeches take up oxygen dissolved in water. All type of contaminants cause stress to the leeches causing secretion of mucous layer over their bodies. Leeches are hermaphrodite, but there is still a need of a partner for reproduction. Reciprocal fertilization leads to reproduction in leeches. Young leeches are produced in 3-5 weeks from the eggs stored in cocoons. These young leeches feed on the blood of frogs and fishes. At the age of 2 years, these leeches are fully matured to be used for therapeutic purposes. Leeches have a pair of suckers, anterior and posterior sucker. An anterior sucker is oral sucker consisting of the jaw and teeth and is used for feeding by connecting to host. Through this, sucker leeches secrete their salivary secretion, which is an anaesthetic, which makes the host insensitive to its bite. These are responsible for various therapeutics benefits like anticoagulant, anti-inflammatory, anaesthetic, thrombolytic, vasodilator and anti- oedematous,

bacteriostatic and blood and lymph enhancing properties. The digestive tracts of a leech consist of 3 major parts. The first part is the pharynx, which is the extension of the oral region and lies adjacent to the salivary glands. The second part is the crop, which is the storage organ for the ingested blood. The third part is intestine. For medicinal purposes, leeches bred on certified bio farms are used. These leeches are stored in a sterile container with non- chlorinated water.

INDICATIONS FOR *JALAUKAVACHARANA*:
Rakta-pitta vikaras

ACC. TO *ACHARYAS SUSHRUTA, CHARAKA* AND *VAGBHATA*
Vidradhi (abcess), *Gulma* (various gastrointestinal diseases), *Mukhapaka* (errosion in oral cavity), *Arsha* (Haemorrhoids), Vataraktha (gout), *Kustha* (various skin diseases), *Dusta Vrana* (ulcers), *Shavythu,* skin grafting, *Twaka Vikara* (skin diseases), *Galamaya* (diseases of throat region), *Netraroga* (various diseases of eye), *Visha* (poisoning), *Visarpa* (inflammatory skin diseases), *Pleeha*, *Agnisada* (loss of appitite), *Jwara, Mukhrog, Shirorog, Mada, Trishna* (excessive thirst), *Raktapitta* (haemorrhagic disorders), *Brahma, Lavan Asyata* (unreasonable excessive salty taste perception), *Katu Amla Tikta Udgara* (belching with bitter and acidic taste), *Raktameha* (blood discharge with urine), *Pradara* (vaginal discharge), *Guru Gatrata* (heaviness in body), *Santapa* (febrile condition), *Atidurbala* (excessive wekness), *Aruchi, Nidra Atiyoga* (excessive sleepiness), *Tamaas Atidarshana* (unexplained frequent blackouts), *Kandu* (itching), *Kota, Pidika, Charmadala, Puti Garana* (smelly secretion from nose), *Asya Gandhata* (smelly mouth or smelly secretion from mouth), *Upkush* (bleedind gums), *Prameelaka* (fatigue), *Vaivarnya* (discolouration of skin), *Klama* (unexplained fatigue), *Vidaha, Krodha Prachuryata* (excessive explained anger), *Buddhi Sammoha* (confusion), *Sweda Sharir Durgandhya* (excessive sweating with or without foul odour), *Kampa* (tremors like pathological condition), *Swara Kshaya* (vocal intensity decreased), *Tandra* (unexplained mental fatigue), *Granthi, Shofa Roga*.

MODE OF ACTION IN SOME DISEASES:
1. TAO
In case of TAO, where the arterial insufficiency is the main cause of the discolouration of the wound site. Hirudin and Hyaluronidase break down hyaluronic acid.

2. Varicose vein
Venous decongested – Reversal of edema – Hyperpigmentation reduces – Healing of varicose ulcers

3. Skin Grafting
Failure of adequate venous return from a graft reduces blood supply, causing tissue necrosis.

Placing a leech on the congested skin flap, finger or compromised area removes the congested blood and enables the graft to be savaged.

Leeches are currently used during post-operative care of reimplanted fingers, skin grafts, and breast reconstructions.

Fresh leeches are applied as required for several days or weeks until the venous congestion is relieved and normal venous drainage of the graft has had time to develop.

4. Cosmetics
As for the advantages of the leech saliva, it improves blood microcirculation and supplies oxygen to tissues, stimulates the local immune system, antioxidant activity, eliminates pigmentation disorder, protects the skin from the environment, slows down aging, makes the skin more elastic and keeps moisture.

5. Coronary artery diseases –
Apply *jalauka* over the chest near the heart to get a better result. So, by bloodletting of 10-30 ml with *jalauka* healing process in coronary tissues before as well as after ischemic evidences in the heart preventing damage to the myocardium. *Jalauka* injects more than 100 bioactive substances into circulation around the applied area which relieves local inflammation and promotes normal flow around the coronary circulation increases oxygen supply which promotes tissue metabolism and eliminates the coronary tissue ischemia.

***JALAUKKA* USE:**
"The clinician who knows all about the leeches, their habitat, their method of collection, varieties, storage and method of application is successful in treating the diseases amenable to them"

Application of the leech is the most delicate method of bloodletting prescribed particularly for the benefits of Kings, wealthy persons, children, timid, debilitated, women, the most delicate people.

In Ayurveda, it says that *Jalauka* is *PARAMA-SUKUMARO-AYAM* for *Raktmokshana*.

***JALAUKAVACHARANA VIDHI* (METHOD OF LEECH APPLICATION):**
1. ***Poorva karma*** – Before the application of leech, it should be kept in the *haridra* mixed water till they become active because *haridra* acts as disinfectant and increase their appetite and blood – sucking capacity then cleaned with the help of pure water.

Scientific reason behind the activation of leech.

The digestive tract of the medicinal leeches has been found out to contain 2 types of bacteria's namely –

A. Aeromonas Veronii
B. Aeromonas Rikenella
C. Aeromonas Hydrophilla

If these enters the blood circulation, it may cause wound infections.

2. ***Pradhana karma*** – Prick the skin with a sharp, sterile needle to release a drop of blood, then apply the leech through its mouth end and cover it with wet cotton.

3. ***Paschata karma –***

A. Leech removal: After 45 minutes, the leech usually leaves the site itself. If it doesn't remove itself, then apply turmeric powder to the leech's mouth.

B. Care of wound: After the leech has been detached, the mouth of the leech leaves a triangular wound. The use of *Jatyadi Ghrita* with a tight bandage stops the bleeding from the wound.

C. Jalauka's *Vamana*: The leech used on the affected site will have to go through a *vamana* process so that it can be used on the same patient again. Turmeric powder is put to the leech's mouth for *vamana*. To purify itself, the leech vomits impure suck blood. For good *vamana*, it is sometimes necessary to press the leech from the caudal to the frontal end. After proper *vamana,* the leech should be placed in fresh water where it will swim quickly, and it should be placed in a clean container filled with water having multiple pores on the top for proper aeration.

AREA OF *DOSHANIRHARANA* BY *JALAUKAVACHARANA:*

Jalauka removes the dosha's from one *hasth* area.

COTRAINDICATIONS OF *JALAUKAVACHARANA:*

Sarvangashotha, Ksheena, Pandu, Arsha, Udara Roga, Shosa, Garbhini Shotha

Blood clotting disorders, severe anaemia, allergics reaction

FREQUENCEY OF *JALAUKAVACHARANA:*

The frequency of leech application will vary according to the diseases and severity. Generally, leech should be applied once in a week up to 12 sittings.

DISCUSSION:

Jalaukavacharana is more effective than topical analgesics and anti-inflammatory agents in the treatment of inflammatory and degenerative joint diseases such as gout and osteoarthritis. Venous congestion can be best treated with the application of leeches because of the small blood volumes removed by leeches and the increased blood removal during the passive bleeding phase of leech therapy decreases venous congestion remarkably. In addition to this, a broad number of anticoagulant agents present in leech saliva also help in decreasing venous congestion present in Burger's diseases, varicose veins, venous thrombosis etc. Leeches have also been shown to be effective in the treatment of non-healing ulcers and diabetic foot.

CONCLUSION:

Jalaukavacharana is very useful in many acute and chronic disorders. And with the above discussion, it can be concluded that over the years, the use of leeches has evolved from a simple bloodletting procedure into a scientifically based physiologic process with rationally defined clinical applications.

REFERENCES

[1] Shastri A.D. Sushruta, Sushruta samhita edited with Ayurveda Tattva Sandipika, Chaukhambha Sanskrit Sansthan, Varanasi, reprint-2010*, (S.Su.13/3,6,24)*

[2] Dr. Smt. Shailaja Srivastava, Sarngdhara Samhita edited of Acharya Sharngadhar "Jiwanprada" hindi commentery of 2nd ed. Varanasi (India): Chaukambha Orientalia, 1998; (Sha.U.12/17).

[3] Sastri K, Chaturvedi GN, Sastri R Upadhyaya Y, Pandeya GS, Gupta B,Vata Vyadhi Chikitsa, Caraka Samhita of Agnivesa with elaborated vidyotini Hindi Commentry, Reprinted ed.Varanasi: Chaukhambha Visvabharti; 2015.Vol.2, *(C.Su.24/12).*

[4] Gupta KA, Upadhyaya Y, Vatavyadhi Nidanam. In Astanga Hrdayam of Vagbhata Vidyotini hindi Commentary, Reprinted ed. Varanasi: Chaukhambha Prakashan; 2017.vol 1, *(AH.Ni.15/14), (AH.Chi.21/22).*

[5] Vaidya Laksmipati Sastri,Vatavyadhi Nidanam,Yogratnakara with Vidyotini Hindi Commentary, Reprinted ed. Varanasi: Chaukhambha Prakashan;2018.vol 1, Vatavyadhi Nidanam,page no.505, Vatavyadhi Chikitsa page no.517.

[6] Vaidya Trikamji Acharya J, Ram Acharya "Kavyatirtha" N. Sutrasthana 17:27,28. Susruta samhita of Susruta with the Nibandhasangrah Commentary of Sri Dalhanacharya and the Nyayachandrika Panjika of Sri Gayadaacharya on Nidanasthana. 2008 Edition, Varanasi. Chaukhambha surabharati Prakashan, 2008; 84.

[7] Dr. Shivprasad Sharma, Ashtang Sangrha edited with "Shashilekha" sanskrita commentary of shri Indu, Varanasi: Chaukhamba Sanskrit Series office, Chikitsa Sthanam chapter, 23/11: 565.

[8] Brahm Shankar misra, Bhavprakash edited hindi commentary of bhavshankar misra, reprint 2003: Chukhambha sankrit Bhawan varanshi, madhyam khand vatavyadhiadhikar, 24/257.