

SIGNIFICANCE OF *JALAUKAVACHARNA* (LEECH THERAPY) IN 21ST CENTURY

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ABSTRACT

The disease burden on society has shifted in the twenty-first century, from infectious to metabolic disorders, and as a result, average global life expectancy has more than doubled from being 31 years earlier to 65 years of age now. Previously, the mortality rate was higher than the morbidity rate, but this has now been reversed due to recent advances in the medical field. The evolution of modern technology has led to the supersonic world we live in today, where everything is at our fingertips, but this advancement has come at a very high morbidity cost. Today's highly competitive lifestyle and adulterated food habits have inflicted greatest dent on the economy, breaking the backbone of our country. It has led to a variety of lifestyle and metabolic disorders, including cardiovascular disease, obesity, diabetes, hypertension,

cervical spondylosis and lumbago among others. For ages, *Jalaukavacharana*, also known as leech therapy, has been practiced to treat patients. Leech therapy's therapeutic efficacy has been documented in a variety of dermatological, cardiovascular, gastrointestinal diseases, varicose veins, haemorrhoids, reconstructive surgeries, and other conditions. Furthermore, the therapeutic efficacy of *Jalaukavacharna* can be used for preventative purposes in various lifestyle disorders, since prevention is always better than cure.

KEYWORDS: *Panchkarma, Jalaukavacharna, Metabolic Disorders, Leech Therapy.*

BACKGROUND

A dilemma of so-called developed countries is that, as major historical causes of human mortality have been eliminated or minimized by medical progress, lifestyle-related diseases and metabolic disorders have become major killers. Moreover, although the complementing effects of modern medicine extend lifespan, health span fails to keep up due to the burden of non-communicable diseases associated with nutrition and sedentary lifestyle. In today's supersonic world, wherein everything is at our fingertips, this growth has come at a very high cost in terms of comorbidities, causing the biggest damage to the economy and destroying our country's backbone.

Cardiovascular diseases continue to remain the leading cause of death, accounting for over 30% of all deaths worldwide. The prevalence of lifestyle conditions related with cardiovascular diseases, such as hypertension, diabetes mellitus, dyslipidemia, and overweight/obesity, is on the rise. With rapid economic development and rising western influence of lifestyle in recent decades, the prevalence of chronic diseases among Indians has escalated to alarming rates.^[1]

As Ayurveda is regarded as the most important life science and describes methods to prevent and manage lifestyle disorders, the world is becoming more interested in its potential. Ayurveda provides better solutions in the form of proper dietary management, lifestyle recommendations, *Panchakarma*-like detoxification and bio-purification procedures, medications, and rejuvenation therapies. Ayurveda's holistic approach, which treats the patient as a whole, implying intervention aimed at complete physical, psychological, and spiritual well-being, makes this science a great alternative in lifestyle disorders.

INTRODUCTION

As per *Sushruta* and *Vagbhata*, *Raktamokshana* is fifth *karma* of the *Panchkarma* therapy. It is a key non-pharmacological intervention in which vitiated *Rakta Dosha*, along with *Pitta*, is eliminated through the body utilising various techniques such as *Sira vedha*, *Jalaukavacharna*, *Shringa*, or *Prachhana*. *Rakta* is the medium through which vitiated *Dosha* travels and spreads from one location to another. When vitiated *Rakta* is evacuated by *Visravana*, the *Doshas* are unable to vitiate and spread to newer *Dhatu* and the disease process remains confined. That's why *Raktamokshana* is considered as the half treatment in surgical diseases, according to *Acharya Sushruta*.^[2]

Raktamokshana is divided into two groups depending on the its application: *Shastrakrita* and *Ashastrakrita*. *Shastrakrita* furthermore includes two methods: *Siravedha* and *Pracchana*. The *Ashastrakrita* method can be performed with *Shringa*, *Jalauka*, *Albu*, and *Ghati yantra*. *Jalaukavacharana* (Medical Leech Therapy) is a unique *Raktamokshana* method. *Jalaukavacharana* involves the application of cultured leeches to the affected sites. *Jalauka* was also described by *Acharya Sushruta* under the title of *Anushastra* (para surgical procedures). It is one of the oldest treatment modalities, used by a number of medical practitioners in various medical conditions.

AIMS AND OBJECTIVE

- To evaluate the role of *Jalaukavacharana* in diseases prevailing in 21st century.
- To determine the necessity of *Jalaukavacharana* in lifestyle disorders.

MATERIALS AND METHOD

The study is carried out through a variety of literature review from Classical Ayurvedic texts like *Brihatrayi* and *Laghutrayi*. Various published research articles on Leech therapy were also searched for this conceptual study and a critical analysis of the acquired information was done.

DISCUSSION

The three primary *Doshas* (humours) listed in the Ayurvedic literature are *Vata*, *Pitta*, and *Kapha*. Disease arises as a result of disordered humours. An additional *Dosha* mentioned in *Sushruta Samhita* is *Rakta*. So in Ayurveda *Rakta* is both *Dosha* and *Dhatu*. The major causes of *Rakta* derangement are the consumption of inappropriate food items, as well as numerous psychological aspects and a plethora of activities that lead to an unhealthy lifestyle. Food items such canned goods with preservatives, fermented products, complex, irritants, contaminated food items, and food items with an elevated pH are identified as leading contributing factors, combined with physical inactivity.

All of the elements that contribute to the development of *Rakatja Rogas* which are key contributors to modern-day lifestyle disorders. The arena of *Raktaja* disorders includes haemorrhagic disorders, inflammatory condition, skin disorders, metabolic disorders, among others. *Pitta Dosha* and *Rakta Dhatu* are in close synergy as per the fundamentals of *ashraya* and *ashrayi bhava*.^[3] It implies that treatments or medications that raise or lower their levels in the body would also raise or lower the other as well.

The leech is an aquatic worm with a flattened body, tapering end terminating in circular flattened disc. The leech belongs to the kingdom (Animalia); Phylum (Annelida); Class (Hirudinea). Leech can ingest an amount of blood close to that of eight times of their own weight. The leeches can be primarily found in the freshwater lakes, ponds or rivers ranging from 5cm to nearly 25 cm.^[4]

Many studies have found that leeches have various bioactive molecules in their secretions. There are more than 20 known bioactive compounds, including *antistasin*, *eglns*, *guamerin*, *hirudin*, *saratin*, and *bdellins*. Their modes of action, including analgesic, anti-inflammatory, platelet inhibitory, anticoagulant, and thrombin regulatory effects, as well as extracellular matrix degradative and antimicrobial effects, have been identified.

Table No. 1: Bioactive molecules present in Leech Saliva^[5]

Bioactive Ingredients	Benefits
Hyaluronidase (spreading factor):	For penetration and diffusion of active substances into the tissues, and has antibiotic properties.
Hirudin (a potent anticoagulant):	It inhibits blood coagulation by binding to thrombin.
Calin:	Inhibits blood coagulation by blocking the binding of the Von Willebrand factor to collagen.
Destabilase:	Has thrombolytic effects.
Bdellins:	Anti-inflammatory effect
Acetylcholine:	A vasodilator.
Histamine-like substances:	A vasodilator increases the inflow of blood at the bite site.
Hirustasin:	Inhibits kallikrein, trypsin, chymotrypsin, and neutrophilic cathepsin G.
Eglins:	Anti-inflammatory.
Factor Xa inhibitor:	Inhibits the activity of coagulation factor Xa
Carboxypeptidase-A inhibitors:	Increase the inflow of blood.
Collagenase:	Reduces collagen.
Complement inhibitors:	Replace natural complement inhibitors if they are deficient.

Because of these bioactive molecules, leech therapy is being used in wide range of conditions like varicose vein, ringworm, alopecia, lymphadenitis, malignant ulcer, psoriasis, eczema, elephantiasis, gangrenous wound, osteoarthritis, phlebitis and thrombotic conditions, preventing post-surgical blood clotting, odontalgia, periodontitis and alveolar abscess, post-operative skin grafting lesions, revascularization of amputated fingers & toes after replantation procedure.

Leech therapy has established itself as an alternative remedy for the treatment of vascular disorders, since leech saliva can temporarily improve blood flow and ameliorate connective tissue hyperalgesia.

By the year 1997, a novel antithrombotic and anticoagulant pharmaceutical preparation was released to the Russian markets under the trade name “Piyavit”, which consisted of the medicinal leech saliva extract. The product was prescribed as thrombolytic and antiplatelet. Clinical studies revealed that it can reduce blood hypercoagulability with an anti-inflammatory effect in patients with thrombophlebitis.

The effectiveness of leech saliva in CVDs is the results of specific thrombin inhibitors, hirudin, which was first isolated from *H. medicinalis* and was shown to possess a potent inhibitory effect on both free and clot-bound thrombin.

Noteworthy, hirudin is the only hematophagous animal-derived anticoagulant has been approved by FDA for clinical purposes. Many studies revealed that hirudin is more effective than heparin in preventing deep venous thrombosis (DVT) and ischemic events in patients with unstable angina.

Furthermore, and unlike heparins, hirudin has a promising prophylactic activity in patients who are at a high-risk of developing cardiovascular events because it can hinder thrombus growth due to its ability to block thrombin-fibrin binding. Consequently, it was reported that hirudin can reduce DVT, pulmonary embolism and the spread of venous thrombosis.^[6]

Moreover, hementin and hementerin were characterized from *H. ghilianii* and *H. depressa* and reported as fibrinogenolytic enzymes. Interestingly, the cleavage of fibrinogen leads to early blockade of the coagulation cascade, which also makes fibrinogen lytic compounds very promising therapeutical tools.

CONCLUSION

The technique is cheap, effective, easy to apply, and its modes of action have been elucidated for certain diseases. Leech Therapy is a part of multidisciplinary treatments, and secretes various bioactive substances. These substances vary among species and different species should be evaluated for both treatment capability and their particular secreted molecules. There is huge potential for novel substances and these could be future therapeutics.

The anticoagulant property of Hirudin contained in leech saliva may lead to wider therapeutic application in the prevention and treatment of thromboembolic disease like angina pectoris, coronary thrombosis, atherosclerosis and varicose vein.

In *Ayurveda*, *Raktamokshana* is described in Autumn season as a preventive measure because this season is *Pitta Prokoa Kaala*. Moreover, *Raktamokshana* by *Jalukavacharana* will be more beneficial compared to other methods because it is indicated in *Pitta Pradhan Vyadhi* and is more beneficial than simple bloodletting. Furthermore, Acharya Sushruta has stated that if bloodletting is done at regular intervals then the individual will not have any kind of skin and blood related disorders.^[7]

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