



Review Article

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## **IRSĀL-I-'ALAQ: A CLASSICAL REGIMEN OF THE UNANI SYSTEM OF MEDICINE – A SCIENTIFIC REVIEW**

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### **Abstract**

The *Unani* system of medicine, is based on the principle of equilibrium which states health exists when the four *akhlāt* (humours) of the body— *dam* (blood), *ṣafrā* (yellow bile), *saudā* (black bile), and *balgham* (phlegm)—are in perfect balance and harmony. Any disturbance back to a state of wellness and vitality. *Irsāl-i-'Alaq* (Leech Therapy) is effective mode of treatment in which medicinal leeches are applied to specific body sites for various diseases. It began as an ancient blood-balancing ritual over 2,500 years ago became a sophisticated therapeutic tool in *Unani* medicine under the name *Irsāl-i-'Alaq*, fell out of favour in the early 20<sup>th</sup> century, and has now revived as strong evidence-supported treatment in both latest micro-surgery and traditional medical systems. In *Unani* medicine, leech therapy is classified as a type of *Istifrāgh* (evacuation). It removes morbid material (*Tanqiya-e-Mawād*), diverts pathological fluids (*Imāla-e-Mawād*), restores humoral balance, improves local circulation and tissue nutrition. Over 115 scientifically identified bioactive compounds (anticoagulants, vasodilators, anaesthetics, proteinase inhibitors, etc.), which exerts *Mussakin* (analgesic) and *Muḥallil* (anti-inflammatory) actions. Latest researches validates its unique efficacy in the management of pain in diseases like osteoarthritis, chronic low back pain, venous congestion, and is used as an adjunct therapy to heal chronic wounds, including diabetic foot ulcer.

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Renowned *Unani* scholars recommended use of only non-poisonous medicinal leeches for therapeutic purpose. Following the strict protocol related to proper identification and procedure minimises the appearance of adverse effects associated with leech therapy. Leech therapy has now been approved by FDA (2004) and it is commonly used worldwide for management of skin disorders, pain management, and plastic reconstructive surgeries. *Irsāl-i-'Alaq* exemplifies successful integration of traditional *Unani* practice with evidence-based medicine, providing a safe, cost-effective, and often superior alternative or adjuvant treatment in some conditions.

**Keywords:** *Irsāl-i-'Alaq*, Leech therapy, *Unani* system of medicine, *Ilāj bi'l Tadbīr*, Osteoarthritis

### Introduction:

The four modes of treatment described by *Unani* system of medicine are: *Ilāj bi'l-Ghidhā* (dietotherapy), *Ilāj bi'l-Dawā* (pharmacotherapy), *Ilāj bi'l-Tadbīr* (regimenal therapy), *Ilāj bi'l-Yad* (surgery). *Ilāj bi'l-Tadbīr* is one of the most widely used treatment methods in *Unani* medicine, practised by physicians since ancient times. The Arabic word *Tadbīr* means “regimen” or systematic plan, while *Ilāj* refers to “therapy” or treatment. Thus, *Ilāj bi'l-Tadbīr* literally means treatment through regimen. It involves managing the care of the patient and preserving overall health by following a systematic plan. Renowned *Unani* scholars, like *Buqrāt* (Hippocrates), *Jālīnūs* (Galen), *Razī*(Rhazes), *Ibn Sina* (Avicenna), and *Al-Zahrawi* (Albucasis), have elaborated a wide range of regimenal therapies (*Ilāj bi'l-Tadbīr*) for treating diseases. These may also be applied adjuvant with other treatment modalities. Key regimenal approaches include: Dietary adjustments, Physical exercise, and Lifestyle modifications. *Tanqiya* (Evacuation) or *Imāla* (diversion) of morbid humours through procedures such as: *Hijamah* (Cupping therapy), *Dalk* (Massage), *Irsale alaq* (Leech therapy), *Fasd* (Venesection/Phlebotomy), *Ishal* (Purgation), *Qay'* (Induced vomiting), *Idrar-e-Bawl* (Promoting urination), *Huqna* (Enema), *Ta'riq* (Inducing sweating), *Tanfith* (Expectoration), and *Abzan* (Sitz bath). Other commonly employed regimens for removing or redirecting morbid matter, or for resolving inflammation, includes: *Hammam* (Steam/Turkish bath), *Natool* (Body Irrigation), and *Takmid* (Fomentation).<sup>(1)</sup>

These procedures continue to form the foundation of regimenal therapy in the *Unani* system of medicine. Bloodletting performed through *fasd* (venesection), *Irsāl-i-'Alaq* (Leech

therapy), or *hijamah bi'l shart* (wet cupping) forms a cornerstone of *Unani* surgical and therapeutic purpose. For thousands of years, classical *Unani* physicians have employed these methods not only for treatment but also for disease prevention.(2) In the *Unani* system of medicine, bloodletting is founded on the principle of humoral imbalance. Diseases arise when the four *akhlāt* (humors) become imbalanced, while restoring their equilibrium promotes health. According to *Unani* scholars, most illnesses result from endogenous causes, primarily the excessive buildup of morbid humors.(3) *Irsāl-i-'Alaq* (Leech therapy) is a traditional regimen of *Tanqiya* (evacuation) used to remove *Mawād-i-fasida* (morbid humours) from the body. In this procedure, medicinal leeches are placed on the affected area, where they draw blood from deeper tissues while simultaneously injecting their saliva, and where the other procedures of bloodletting like venesection and cupping are not possible leech therapy can be best advised on those areas.(4) Leech saliva contains a rich blend of biologically and pharmacologically active compounds.

In recent years, numerous scientific studies have provided evidence supporting its therapeutic efficacy in conditions such as osteoarthritis, hypertension, and various skin disorders.(1)

### Historical context

It is difficult to pinpoint the exact time when humans first discovered leeches for therapeutic use. This minimally invasive treatment has been practiced for over 2,500 years and continues to be relevant today. The earliest conclusive evidence comes from an ancient Egyptian tomb wall painting dated around 1500 BCE, depicting the application of leeches on a patient's head during the 18th Dynasty pharaohs (1567–1308 BCE). These illustrations from ancient Egypt provide the first documented record of leech therapy in medical history.(5) Leeching is also mentioned in medical encyclopaedia from India written in Sanskrit completed between 500 BC and 200 AD. Leeches are known by following vernacular names: *Alaq* (Arabic); *Zalu* ( Persian ); *Jonk* ( Urdu ); *Salook* (Turkish); *Leech* ( English ); *Hirudo* (Latin); *Bdella* (Greek); *Jaluka* (Sanskrit); and *Jalu* ( Hindi).(6)

The earliest recorded medicinal use of leeches is attributed to Nicander of Colophon (c. 200–130 BC), followed shortly by Themison of Laodicea (c. 123–43 BC), a student of Asclepiades. In the Roman period, *Jālīnūs* (Galen) (129–c. 200 AD) strongly advocated bloodletting with leeches, viewing it as a means to remove harmful substances caused by disease and to re-

establish balance among the four humours. The renowned Persian physician Avicenna (980–1037 AD) considered leeches superior to wet cupping because they drew blood from deeper tissues. In *Al-Qānūn fi'l-Ṭibb* (The Canon of Medicine), he provided detailed guidance on the application of leeches and the types suitable for therapeutic use. Further descriptions appear in the Arabic surgical text *Kitab al-Umda fi al-Jarahat* by *al-Maseehi* (1233–1286 AD), which outlines the characteristics of poisonous leeches to avoid and recommends medicinal varieties such as mush-coloured, blackish-red, liver-coloured, yellow, and thin leeches resembling a mouse's tail.(7)

Leech therapy enjoyed widespread popularity as a bloodletting method during the 18th and 19th centuries, reaching its height in France around 1830 under the influence of Pierre-Charles-Alexandre Louis's teacher, François-Joseph-Victor Broussais—the most enthusiastic proponent of bloodletting in medical history. Broussais maintained that virtually all diseases stemmed from inflammation caused by local accumulation of blood.(8)

In the 1980s, medicinal Leech therapy experienced a major revival among plastic and reconstructive surgeons, who employed leeches to prevent venous congestion and promote circulation, particularly following skin flaps and microsurgical replantation procedures, vascular diseases, arthritis and migraine etc. This application marked a pivotal turning point and remains one of the most prominent examples of its continued clinical relevance today.(9)(10) In 2004, the Food and Drug Administration (FDA) approved leeches for medicinal purposes.(8)

### **Medicinal Leeches and their characteristics**

Leeches are annelid worms that are either carnivorous or hematophagous (blood-feeding), possessing a remarkable capacity to elongate and contract their bodies. Approximately 650 species of leeches are known worldwide, of which 45 species distributed across 22 genera have been reported in India. It was believed earlier that leeches merely suck blood, but advancement in science and technology have demonstrated that, in addition to bloodletting, they secrete a cocktail of biologically active substances through their saliva. These compounds are primarily responsible for the beneficial therapeutic outcomes observed. Today, only farm reared medicinal leeches that have been raised under controlled conditions and subjected to rigorous quarantine and biosafety protocols are used. Wild leeches are no

longer employed, and each leech is used for a single patient and single treatment session only (single-use policy).**(11,12)**

On the basis of specific characteristics *Unani* scholars have categorised leeches into two groups: Non-poisonous which are used for therapeutic purpose and Poisonous leeches. *Al-Quf* further recommended using specific types of high-quality non-poisonous medicinal leeches: Those resembling yellow locusts (i.e., yellowish-green ones), small-sized “mash color” leeches, and dark reddish-black leeches. He also explained and elaborated on *Ibn Sina*’s (Avicenna’s) earlier statement, clarifying that the best leeches come from waters inhabited by frogs—because the presence of frogs indicates clean, soft, and non-toxic water, as frogs help purify the water and remove harmful impurities.**(7,13)** Leeches should be carefully be examined otherwise use of poisonous leeches can result in various kind of disease, like inflammation, haemorrhage, ulcer, fever and paresis of limb etc.**(14)**

### **Guidelines for leech therapy procedure**

According to *Ibn Sina* (Avicenna):

- Leeches should be collected one day before application.
- Prior procedure, patient should be given a light and soft semi-solid meal.
- The area to be treated must first be cleaned thoroughly with distilled water or borax solution, then rubbed vigorously until it becomes red and hyperaemic.
- If the leech does not attach readily, a small amount of blood can be applied to the skin to encourage it.
- Leeches are then placed on the affected area remain attached for approximately half an hour. Once properly attached, leech usually stays in position until it is fully engorged, but the site should be monitored constantly to ensure the leech has not detached prematurely.
- When procedure is complete, the leeches are removed either by gently pulling them off or by applying table salt, borax, or mild heat to make them release their grip; in some cases, they detach on their own.
- After use, the leeches are sacrificed and discarded.**(3,4,15)**

### **Mechanism of action**

Based on the concepts of *Unani* medicine, leech therapy works on the principle of bloodletting. *Irsāl-i-‘Alaq* (Leeching) is used as one of the method of *Istifrāgh*. And work on

principle of *Tanqiya-e-Mawād* (evacuation) by placing leeches directly over the affected areas. Leeches due of its unique ability can remove *mawad-e-fasida* (morbid material) from the body and protect it from various diseases.(16) Hence, *Unani* physicians adopt leeching as an effective mode of treatment due to these benefits.(14) It also improves circulation and provides better nutrition to the area. Another one is *Imāla-e-mavad*, refers to the diversion of the morbid fluids from the site of affected organ to the site where from it is easily expelled from the body tissues. Based on this holistic approach, *Unani* physicians have been widely using this therapeutic regimen for a number of diseases. The effectiveness of this therapy may also be attributed to the *Mussakin* (sedative) and *Muḥallil* (resolving) actions of saliva of leeches.(3,17) Earlier it was assumed that leech therapy depends mainly on two concepts. First, as the leech bites the skin of its prey, it injects the salivary gland secretion into the wound. Second, another part of these secretions will be mixed with the ingested blood to keep it in a liquid state.(4,14) Whereas later on scientific researches revealed that the beneficial effects of leeching occur due to injecting some bioactive substance which are present in leech saliva.(18) Pharmacological researches stimulated the isolation of at least 115 bioactive compounds which includes anticoagulants, antioxidants and other proteinase inhibitors and many more substances are studied so far. These bioactive compounds exert a variety of therapeutic effects on the body.(19)

### Chemical composition of saliva

Earlier understanding focused on two actions:

(1) Injection of salivary secretions at the bite site, and (2) Prevention of blood coagulation inside the leech's gut.(4,14) Latest research, however, has shown that the primary therapeutic benefits arise from numerous bioactive molecules present in leech saliva. These include potent anticoagulants (e.g., hirudin), antioxidants, protease inhibitors, analgesics, anti-inflammatory agents, and many others—at least 115 pharmacologically active compounds have been identified and studied. These substances endeavours a wide range of beneficial effects on the host, confirming the traditional use of leeches as highly effective therapeutic agents.(18)

### Indications

Leeches were historically believed to treat a wide range of conditions, from headaches to haemorrhoids. In ancient and *Unani* medicine, physicians employed *Irsāl-i-'Alaq* (Leech

therapy) for various disorders, including chronic skin conditions, eye diseases, musculoskeletal issues, gynaecological problems, ENT disorders, thromboembolic conditions, localised congestion, brain congestion, and mental illness. **(2-4,14,20)**

HUMAN BODY SYSTEM	DISEASE
<i>Amrāḍ e niẓām e aṣab wa naḥṣaniya</i> (Disease of Nervous system and Psychiatric Diseases)	<ul style="list-style-type: none"> <li>• <i>Mālinkhūliyā</i> (Melancholia/mania)</li> <li>• <i>Sozish-e-dimagh</i> (Meningeal pain)</li> <li>• <i>Junoon</i> (Psychosis)</li> <li>• <i>Falij</i> (Paralysis) <b>(21,22,23,24)</b></li> </ul>
<i>Amrāḍe raas</i> (Disease of skull)	<ul style="list-style-type: none"> <li>• <i>Sudaa muzmin</i> (Chronic headache) <b>(21,23,24)</b></li> </ul>
<i>Amrāḍe Qalb</i> (Cardiovascular system disorder)	<ul style="list-style-type: none"> <li>• <i>Sadd-e-Shiryānī</i> (Thromboembolic diseases)</li> <li>• <i>Qillat-ud-Dam ila-I-Qalb</i> (Ischemic heart disease) <b>(4)</b></li> </ul>
<i>Amrāḍe niẓāme e tanaffus</i> (Diseases of Respiratory system)	<ul style="list-style-type: none"> <li>• <i>Warne Tajaweful Anaf</i> (Sinusitis)</li> <li>• <i>Warne halq</i> (Pharyngitis)</li> </ul>
<i>Amrāḍe Dawrān-i- khūn, tauleed e dam, gudood e lamphaviah</i> (Diseases of Circulatory, Hemopoietic system and Lymphatic system)	<ul style="list-style-type: none"> <li>• <i>Dawali</i> (Varicose veins) <b>(25)</b></li> <li>• <i>Khanaazeer</i> (Lymphadenitis)</li> <li>• <i>Bawaseer</i> (Haemorrhoids/piles) <b>(25)</b></li> <li>• <i>Da-ul- feel</i> (Elephantiasis) <b>(25)</b></li> <li>• <i>Qarh-e-Qadam Zayābītīsī</i> (Diabetic foot ulcer)</li> <li>• <i>Qurooh-e-muzmina ghair mundamila</i> (Chronic Non-healing ulcers)</li> </ul>
<i>Amrāḍe niẓām e hazm, bowl wa tanāsul</i>	<ul style="list-style-type: none"> <li>• <i>Sozish-e-lauzatain</i> (Tonsillar pain), <b>(14,23,24)</b></li> <li>• <i>Warām-e-Lahlahāna</i> (Uvulitis)</li> </ul>

<b>(Diseases of digestive and Uro-genital system)</b>	<ul style="list-style-type: none"> <li>• Qulā (Stomatitis)(7)</li> <li>• Warām-e-Lisān (Glossitis)(7)</li> <li>• <i>Sozish-e-khusiya-tur-raham</i> (Ovarian pain)(14)</li> <li>• <i>Sozish-e-Raham</i> (Uterine pain)</li> </ul>
<b><i>Amrāḍe mutaddiyah, hummiyat</i> (Infectious diseases and fever)</b>	<ul style="list-style-type: none"> <li>• <i>Khunnaq-Damwī</i> (Sanguineous diptheria)(7)</li> </ul>
<b><i>Amrāḍe jild</i> (Skin diseases)</b>	<ul style="list-style-type: none"> <li>• <i>Qūbā</i> (Fungal dermatosis)(14)</li> <li>• <i>Saa'fa</i> (Alopecia)(26)</li> <li>• <i>Namash</i> (Chloasma)(26)</li> <li>• <i>Kalaf</i> (Melasma)(26)</li> <li>• <i>Nār fārsī</i> (Eczema)(26)</li> <li>• <i>Daul sadaf</i> (Psoriasis)(26)</li> <li>• <i>Bars</i> (Vitiligo)(26)</li> <li>• <i>Nar-e-farsi</i> (Eczema) (14)</li> </ul>
<b><i>Amrāḍe mafāṣil</i> (Musculoskeletal disorders)</b>	<ul style="list-style-type: none"> <li>• <i>Waja'al-Sāq</i> (Calf muscle pain)</li> <li>• <i>Wajaul Mafāṣil</i> (Osteoarthritis) (21,23,24)</li> <li>• <i>Wajaul zahr</i>(Backache) (21,23,24)</li> </ul>
<b><i>Amrāḍe chashm</i> (Diseases of eye)</b>	<ul style="list-style-type: none"> <li>• <i>Jarabul Ajfaan</i> (Blepharitis)(7)</li> <li>• Subconjunctival bleeding(7)</li> <li>• <i>Nakhoona</i> (Pterygium)(7)</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• At the biting site of poisonous animal</li> <li>• Scar (14,23,24)</li> <li>• Plastic surgery</li> <li>• Replantation other reconstructive surgeries (14)</li> </ul>



## Contraindication

*Irsāl-i-'Alaq* (Leech therapy) cannot be employed in all the patients. The patients should be firstly examined for their health status. Leech therapy is not given under the following conditions: These include haemorrhagic diseases, absolute haemophilia, Leukaemia, pregnant women, children, severe anaemia, hypotension, coagulopathies, HIV positive patient, general fatigue, allergy to leech or Hypersensitivity reaction, active tuberculosis, mental disorders during acute episode, high temperature, immunocompromised patients, severely ill & bed ridden and in case of extremely fearful patients. According to some Unani physicians, certain sites of the body are also contra indicated for the leech application such as abdomen especially around the liver, spleen, stomach, intestine and buttock. In tropical areas, leech therapy has been prohibited as the site of leech may become infected.(3,14,27,28)

## Adverse effects

*Irsāl-i-'Alaq* (Leech therapy) is generally well-tolerated and regarded as a relatively safe treatment option. In rare instances, patients may develop mild fever accompanied by localised itching at the bite site, which typically lasts from a few minutes to up to 3 days.

*Aeromonas hydrophila*, a bacterium naturally present in the gut, mucous secretions, and suckers of medicinal leeches, can potentially cause infections such as pneumonia, septicaemia, or gastroenteritis. (29) Other reported complications include allergic reactions manifesting as itching, burning sensation, blistering, bullae, pruritus, wheal formation, and ulceration.

Scarring is possible but usually minimal. In some cases, tissue necrosis leading to chronic progressive ulcers may occur due to toxins in the leech saliva, antigenic components in the saliva, or a foreign-body reaction to leech jaw—especially when leeches are detached forcibly. (30)

## Conclusion

It can be concluded that *Irsāl-i-'Alaq* (Leech therapy) has a rich history with scientific evidences and credibility in latest researches. It is highly effective method of treatment in *Ilāj bi'l tadbeer* for variety of illnesses especially musculoskeletal diseases, eye diseases and skin diseases etc.

Compared to oral medication or other mode of treatment, this regimen is safe, easy to administer, affordable, and less likely to cause side effects. Biochemistry has revealed so many bioactive substances in leech saliva—notably hirudin (a potent anticoagulant), hyaluronidase, antihistamines, and analgesics which has multiple therapeutic effects and shown highly encouraging results in clinical studies. Now a days with increasing prevalence of musculoskeletal disorders, skin disorders, thrombotic conditions, traumatic injuries further detailed research is needed along with the development of standard operative procedures (SOP'S) by conducting high-quality clinical trials on latest parameters to further validate and expand its rational use, either alone or as an adjuvant therapy.

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