



DEVELOPMENTS IN LEECH THERAPY (IRSĀL-I-‘ALAQ) THROUGH THE AGES

Amjad Waheed Yousuf^{1*}, Mohammad Akhtar Siddiqui¹, Umar Jahangir¹ and Aasiy ul Erum²

¹Department of Moalajat, School of Unani Medicine, Jamia Hamdard, New Delhi, India.

²Department of Ilmul Advia, School of Unani Medicine, Jamia Hamdard, New Delhi, India.

*Corresponding Author: Prof. Mohammad Akhtar Siddiqui

Professor, Department of Moalajat and Dean School of Unani Medicine, Jamia Hamdard, New Delhi.

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ABSTRACT

Leech therapy (Irsāl-i-‘Alaq or taleeq), is the application of certain species of leeches to a particular area of the body for therapeutic purpose. The use of leeches in medical practice can be traced back to the ancient age even before the word leech was mentioned in Old English language of the Anglo-Saxons. Ancient Egyptian physicians used leeches for bloodletting about 3500 years back while medicinal leeching was also practiced by the people of various ancient civilizations. During the medieval ages, leech therapy found favour with most of the Unani scholars as a method of excreting morbid humors. Extensive guidelines were also prescribed regarding application of leeches, their removal and other basic precautions for the same. Famous physicians like Ibn Sina, Jurjani and many others also described the characteristics and identification of leeches having medicinal properties and differentiated them from the toxic ones. With modern techniques, over a hundred enzymes have been isolated from leech saliva most of which have significant medical benefits. In recent years, efforts are being made to develop devices which could be used as a ‘mechanical leech’.

KEYWORDS: Leech therapy, taleeq, blood-letting.

LEECH THERAPY (IRSĀL I ‘ALAQ)

Leech therapy (Irsāl-i-‘Alaq or taleeq), also known as leeching or hirudotherapy, involves application of medicinally viable leech species to a particular area of body for therapeutic purpose. *Hirudo medicinalis* is the commonest used species of medicinal leech worldwide while *Hirudinaria granulosa* is used most frequently in India. Leech therapy is being frequently used either alone or in combination with pharmacological agents, in the management of various local and systemic disorders.^[1] It is a remarkable therapy and rightfully stimulates the interest of medical historians owing to the fact that it initiated as a part of civilization and as an art in the prehistoric era; progressed to a highly popular form of *istifrāgh* (evacuation of morbid humors) during the medieval ages, so much that the supplies fell short of the demand; and after a brief hiatus in the 19th century, the humble invertebrate regained popularity as it was found to be containing a cocktail of numerous highly potent enzymes in its saliva and is now an important part of some of the most sensitive of surgeries.^[2] Hence, leeching has enjoyed an important place in medical history since the pre-historic ages. Recently, efforts are underway to develop a ‘mechanical leech’ so as to reduce some of the possible adverse events and to enable wider application.^[3]

Early development in history

The word “leech” came into existence earlier in the history of English language and represented two distinct meanings: the blood-sucking worm and the medical practitioner. Nevertheless, use of leeches in medical practice can be traced back to thousands of years even before the word leech was mentioned in Old English language of the Anglo-Saxons.^[4] The 18th dynasty Pharaohs paintings, that existed before Christian era and dated back to 1500 BC, contained reference of leeches. In the 5th century AD Caelius Aurelianus reported that Themison of Laodicea (50 BC), a pupil of Asclepiades, was the first to make medicinal use of leeches, however, a Greek poet and physician Nicander of Colophon (200-130 BC), was probably the first to make written mention of therapeutic leeching in a medical poem “*Alexipharmaca*”. He wrote that on being bitten by a poisonous animal one should apply leeches to extract the poisoned blood.^[5,6,7] Medical indications of leech were outlined by Talmud, Bible and other Jewish manuscripts.^[8] Ancient Egyptian physicians used leeches for bloodletting about 3500 years back while medicinal leeching was also practiced by the people of various ancient civilizations including Mesopotamians, the Greeks, the Mayans and the Aztecs.^[9]

Around 1st century AD more extensive written references of medicinal leeching were found in early Chinese

writings, in ancient Sanskrit manuscripts, and in Persian and Arabic literature. During this period Romans were also aware of leeching and they named leeches as 'Hirudo'.^[10] Pliny the Elder (23-79 AD) believed that superfluous blood of the body is sucked by leeches and it also opens the pores of the skin. He further mentions that once leeches are used they should be applied again at the same period in each succeeding year. According to Pliny leeches are suitable for the treatment of gout and for the killing of bugs, when used as a fumigator.^[6,7] Aretaeus of Cappadocia recommended the use of leeches in case of 'acute disease of liver', in the case of 'satyriasis' and for the treatment of 'abdominal diseases'. During the same period Demosthenes Philalethes, a member and physician of the school founded by Herophilus suggested leech therapy for the management of 'paralysis of the eye'.^[6]

The Syrian, Themisson of Laodicea, who was a pupil of Asclepiades XVI further improved leech therapy for bloodletting at the start of Christian era. According to him evil spirits were the cause of disease and these spirits can be removed by withdrawal of blood from the body.^[5] During the 1st century AD Archigenes also referred to leeches and recommended treatment of 'mania' through leeches by applying them in a circle around the entire head especially on the bregma.^[6]

Galen (Jalinoos) a famous physician of Roman era (130-201 AD) specified the use of leeches, the methods of its application, detachment of leech from the body, the management of bleeding that might result at the site of attachment of the leech after sucking the blood. According to Galen, the proponent of the humoral theory, the body contains four fluids: blood, phlegm, yellow bile and black bile in a specified balance necessary for health. Any changes in the balance of these humors is responsible for disease and leeches suck the disproportionate humors and leads to the restoration of the balance in fluids.^[7] During the same period, Menemachus a physician also advocated use of leeches for medicinal purposes and according to him leeches are applied on diseased parts or on places adjacent to them. He suggested that the sites of application should be free from fat, because the fat reduces their appetite. Another 4th century physician Oribasius also applied leech therapy. Aetius of Amida and Oribasius, Paul of Aegina reported in their works that Antylus, the surgeon, also applied the leech therapy.^[6]

Alexander of Tralles (525-605 AD) advocated use of leech therapy in partial loss of hearing and in the treatment of melancholia. It was believed that melancholia develops due to accumulation of black bile in the brain or in the whole blood and leeches can be used to expel this excessive black bile.^[6] During 6th century AD Aetius of Amida suggested use of leeches for eye disorder which he referred to as "onchia". Leech Therapy was also recommended for "Catharis" which was believed to be caused by the imbalance of body

fluids especially blood. Paul of Aegina in 7th century AD, noted the utility of leeches in the treatment of many diseases that included headaches which he called "cephalea" and eye disorders, referred to as "amourosis" and "ophthalmy", and also for inflammatory disease of the throat.^[7]

Greco-Arabian medicine & Medieval Age

It was Buqrat, the father of medicine, who first introduced leech therapy in ancient Greece and this therapy gained popularity owing to categorization of this therapy as a method of treatment and prevention of disease by Jalinoos (Galen). According to Jalinoos among all the humors blood was considered to be the dominant one and thus the equilibrium in the quality and quantity of blood was considered to be of prime importance for keeping all the humors in balance. To maintain the balance of humors, a physician would either remove excess of blood from the body by way of bloodletting or adopt any other treatment for evacuation of morbid humors.^[9] Historically, bloodletting was carried out by venesection as a remedy for disorders involving congestion or inflammation like engorged hemorrhoids, swollen testicles, laryngitis, prolapsed rectum and inflamed vulva. However, venesection being a painful procedure, leech therapy was widely accepted as an alternative to venesection. Bloodletting by leeching was not only painless, but it also limited the volume of blood loss compared to venesection.^[10]

Further studies and observations by the Unani physicians enabled wider application of leeching in different systemic and local conditions. Leeching rapidly became popular with the Unani physicians and almost all Unani physicians recommended its use in their writings. Zakariya Razi recommended the use of leech in various disease that included Qūba (Fungal Dermatitis), Sa'fa (Alopecia), Qurūh-e-Balkhiya (Chronic Ulcers)^[11] and Waja' al-Mafāsil.^[12]

The Father of Surgery, Abul Qasim Zahrawi (936-1013 A.D) described in his book "Kitab-ul Tasrif" that *fasd*, *taleeq* and *hijamah* can be used for medicinal purposes. He recommended that leech can be applied on the parts of body where cupping cannot be carried out like lips and gums further suggesting that the organs having less flesh can also be treated by way of leeching. To obtain additional benefits of this therapy he endorsed that the site where leeches are applied should be sucked by cupping and washed by vinegar and plenty of water.^[7,13]

Ibn Sīnā (980-1037 AD) the great Arab physician and a pioneer in Islamic Medicine wrote a master piece in medicine "Al-Qānūn fi'l Ṭibb" which was translated into a number of languages and contained several pages of instructions on leeches. He wrote about the disease in which leeches can be used along with the method of their application. In addition, he cautioned against forcible detachment of leeches and advised sprinkling of salt, pepper or snuff. He further suggested that the site of

leeching should be sucked by cupping to remove the toxins. In case of persistent bleeding he employed a dusting of burnt galls, quick lime, ashes, cobwebs, ground earthenware, or alum and if these failed he recommended cautery. According to Ibn Sinā taleeq is more useful than cupping in expelling the blood from the deeper parts of the body.^[4,7,14]

Ismail Jurjani in his book *Zakhira Khwarzam Shahi* suggested that leech therapy should be performed for two consecutive days if complete evacuation of morbid material is to be achieved. He advocated benefit of leeching in skin disorders and noted that it should be done after cleaning the body through purgation and venesection.^[15]

Ibn Hubal Al Baghdadi recommended use of leeches in the treatment of alopecia, chronic wounds and nasal pain as he was of the opinion that leeches remove bad blood from the site of disease. Additionally he was of the opinion that before applying leeches the deranged humors should be evacuated through *faṣd* (venesection) and *Ishāl* (Purgation).^[16,17]

Ibn-al-Quf-al-Masihi (1233-1286) while comparing taleeq (Leech Therapy), *fasd* (Venesection) and *hijamah* (Cupping) remarked that taleeq eliminates the morbid material more vigorously in comparison to *hijamah* but lesser as compared to *fasd*.^[18,19] In his book *Umda-fil-Jarahat Masihi* differentiated the medicinal leeches from non-medicinal (poisonous) leeches taking into account their shape and colour.^[8]

Akbar Arzani, an Indian physician of 16th century stated that leech therapy can be a substitute of venesection among children. He recorded its benefits in chronic disorders like alopecia.^[20]

Modern Age

During 17th and 18th centuries removal of the excessive blood was common method of treatment. Leech therapy was, therefore, widely used during that period. Hence, leeching was used for medicinal bloodletting and a wide range of diseases from gout to headache were believed to be cured by it.^[21] A Surgeon in Napoleon's army units Surgeon Broussais (1772-1838) advocated evacuation of blood from the body or leech therapy because he believed that accumulation of blood in the body leads to inflammation and inflammation in turn causes diseases.^[7] So much was the endorsement of leech therapy that in 18th century France, the physicians prescribed number of leeches for the newly hospital admitted patients even before examining them and were applied without considering the diagnosis, the starting age of the treatment, side effects, and patients health status. In European countries, in Britain and in Russia, during the same period, leech therapy was so popular that it was used for treatment of number of disease including inflammatory brain tissue diseases, nose bleeding, certain ophthalmologic diseases, kidney and liver

diseases, rheumatism, tuberculosis, epilepsy, and sexually transmitted disease.^[22] Europe reported leech shortages during that time.^[21] The physicians of Ottoman period employed leech therapy and many great written works are available especially in 18th century. Serefeddin Sabuncuoglu famous Ottoman physician and surgeon described Leech Therapy in his book *Cerrahiyyetu'l - Haniyye* (Imperial Surgery). Another Surgeon of same period Sanizade Mehmet Ataullah Efendi (1771- 1826), in his work '*Mi'yarul Etibba*' advocated applying leeches to the back of ear for the treatment of fever, which develops in children during growth of teeth.^[7]

Leech trading, after reaching a popular peak during nineteenth century, became a lucrative business eventually encouraging more and more people to collect large number of leeches which made them an endangered species. As a result of this European and American authorities offered rewards for the invention of new methods of leech breeding.^[8]

At the end of the 19th century, as experimental methods gained popularity, leeching gradually fell out of practice and almost stopped by the beginning of twentieth because it did not match the requirements of new medical regulations and the advancements in the field.^[8] This fact is well proved by the records of certain English hospitals, which showed that in 1832 almost 100,000 leeches were used, while 50 years later the number dipped to less than 2000 leeches. With the development of modern physiology, pathology and microbiology, leeches lost their place, not only with physicians but with patients also. During this period only few references of bloodletting could be found.^[5]

It was Haycraft who brought back attention towards leeches with his discovery in 1884 regarding a pure anticoagulant preparation present in the saliva of the leeches which he named '*Hirudine*' from the Latin '*Hirudo*'.^[23] Later in 1955, Markwardt, isolated Hirudin from leeches' pharyngeal glands and accurately characterized it.^[5] After a period of decline, hirudotherapy resurfaced after mid twentieth century finding applications in newer branches of medicine including surgical and reconstruction procedures, vascular disease, arthritis and migraine^[21] and was used as an adjunct to plastic and trauma surgery in the 1970s and 1980s. French micro surgeons in the 1980s started using leeches in distal digital replantation involving arterial repairs only.^[24] Presently leeches find their use in a wide range of disease that include *Waja' al-Mafāsīl* (Rheumatoid arthritis, Osteoarthritis, Gout & Sciatica), *Dā' al-sadaf* (Psoriasis), *Baras* (Vitiligo), *Bawāsīr* (Haemorrhoids), *Qurūh khabītha* (Septic wound & non-healing ulcer).^[1,25,26,27,28,29] In recent years, the focus is being placed to develop a mechanical device which could act like the medicinal leech and eliminate the hassles and complications involved with use of the living annelids.^[2]

CONCLUSION

Leech therapy has come a long way from being a traditional procedure, to being a highly effective and popular means of treatment in several disease conditions. As is evident in this review, the leech has enjoyed immense acceptance with the medical practitioners and patients; royals and commoners alike due to its relatively painless nature, ease of application, few adverse effects and cost-effectiveness. Earlier being used with merely the intention of blood-letting, leeches are now used for the cocktail of medicinally active enzymes present in its saliva. With the developments in medical science, it is understood that the medicinal ingredients present in leech saliva undergo climatic and other changes. Thus, with efforts being made for developing a 'medicinal leech', the therapy may undergo a drastic transformation in the coming years.^[3]

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