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**Case Report** 

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# **EFFECTIVENESS OF LEECH THERAPY IN DIABETIC FOOT ULCERS – A CASE STUDY**

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# ABSTRACT

Diabetes has steadily increased in India and around the world over the last three decades, with India accounting for a sizable portion of the global burden. When chronic and uncontrolled, this disease causes diabetic feet which often lead to unhealed ulcers, resulting in the onset of infections eventually requiring limb amputations, which impacts the individual's physical and mental well-being. A 58 yr. the male patient visited Govt. Ayurvedic Hospital, Patiala with a complaint of chronic nonhealing ulcer on his left foot. After visiting various allopathic hospitals, he'd been advised amputation of his second metatarsal. He was given three sittings of leech therapy and the results when advanced were remarkable. The study below justifies that medicinal leech therapy is an effective, efficient, safe, and in-expensive way to bring about healing in chronic, non-healing wounds which also include diabetic foot ulcers.

Keywords: Diabetes, Diabetic foot ulcers, Nonhealing ulcers, Leech Therapy, Jalauka Avcharana

# INTRODUCTION

Diabetes has steadily increased in India and around the world over the last three decades, with India accounting for a sizable portion of the global burden. Diabetic foot is one of the most severe complications of chronic uncontrolled diabetes which causes lesions in the deep tissues of lower limbs and is associated with vascular and neurological diseases ultimately resulting in amputations. Limb amputation has a major impact on the individual's body image, and can cause loss of productivity, increased dependency, and high costs of treatement<sup>1</sup>. It is a major source of hospitalization, morbidity, and mortality in the elderly. Of all amputations in diabetic patients, 85% are preceded by foot ulceration which subsequently deteriorates into severe gangrene or infection.<sup>2</sup> Foot/limb amputations can be prevented and chronic nonhealing ulcers can be healed following Hirudo-therapy also known as leech therapy. Ayurveda mentions this para-surgical procedure as Jalauka Avcharana. This case study reflects on the same. In Sushruta Samhita Chikitsa Sthan, chapters 12 and 16, Sushrut has advocated that Bloodletting by means of Leech can be practiced in all inflammatory, suppurative, and painful conditions to relieve pain and inhibit suppuration including that of Diabetic ulcerative lesions. In Sushrutasamhita Chikitsa sthan, chapters 12 and 16, Sushrut has advocated that Bloodletting by means of Leech can be practiced in all inflammatory, suppurative, and painful conditions to relieve pain and inhibit suppuration including that of Diabetic ulcerative lesions. In Sushrutasamhita Chikitsa sthan, chapters 12 and 16, Sushrut has advocated that Bloodletting by means of Leech can be practiced in all inflammatory, suppurative, and painful conditions to relieve pain and inhibit suppuration including that of Diabetic ulcerative lesions. In Sushrutasamhita Chikitsa sthan, chapters 12 and 16, Sushrut has advocated that Bloodletting by means of Leech can be practiced in all inflammatory, suppurative

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#### CASE STUDY

A 58-year-old male resident of Nabha, district Patiala, Punjab, India, presented with a complaint of a wound on the dorsum of his first and second toe with marked discoloration on the second toe, which according to the patient had occurred spontaneously one morning around a month ago. The patient was a known case of diabetes mellitus for the past 20-25 years. On examination, the foot was found to be cold and dry. There was the absence of tactile sensation and feeble arterial pulsations (i.e. dorsalis pedis and posterior tibial artery), brittle nails and clear signs of vascular insufficiency were present. On physical examination: the patient was alert, BP: 130/90 mmHg, HR: 96/min, RR: 16/min, SpO2: 99%. No respiratory symptoms with clear chest and upper extremities normal with decreased sensation at the finger tips were observed. The patient had a history of DM × 25 years, and HTN × 5 yrs. He had been on regular allopathic OHA's and other medications for only 3-4 years and was advised amputation of the infected toes. The last toe of the right foot was amputated in an accident 30 years ago.

The probable risk factors specific to the case can be:

- Elevated HbA1c levels
- Neuropathy
- Ischemia

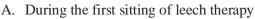
### **DIAGNOSIS & TREATMENT**

The patient was diagnosed with non-healing ulcers as a complication of diabetes. He was treated at the Government Ayurvedic Hospital, Patiala, Dept. of Shalya Tantra. All the laboratory investigations like CBC, PTI\INR, and blood serum were done which came out be with in normal range except for HbA1C which was relatively high i.e. 6.0%. The patient was advised leech therapy and written consent of the patient and the attendant was taken before the procedure. Two mediumsized leeches were applied to the foot. One on the lateral side of the first toe and the other on the dorsal surface of the second toe. 0.5ml of blood was drawn from the median cubital vein and a drop was poured over the wounded site following which the leech got attached to the toe. After about 20 minutes, the leeches left the skin. The wound was cleaned with betadine. Turmeric and alum powder was applied and the wound was covered with a gauze piece. After completion of the procedure, the patient was shifted to the ward to observe any post-therapy complications. OHA's were continued as prescribed. The patient was given a total of three sittings. After the first sitting, he was advised to follow up first at an interval of one week and second at 10 days. Remarkable improvement was seen. The

wound at the first toe had disappeared and the one at the second toe had clean margins and there was a significant reduction in its size.



A



- B. Second sitting of leech therapy
- C. Second sitting of leech therapy

## DISCUSSION

The pathophysiology of diabetic foot ulcers commonly involves three significant features - diabetic neuropathy, peripheral arterial occlusion, and infection which result in deformity.

In this patient, the probable course of the disease can be described as - once the neuropathy set in, it caused increased skin pressure while walking. The poor blood supply and circulation caused limb ischemia and ulcers to spurt out/form at the pressure site. The decreased blood supply acts as a breeding ground for microorganisms and the infection later occurs. In this case, the healing was brought in by improving the blood supply of the area with the help of leeches. They sucked the impure blood, causing negative pressure to build up, hence enhancing the blood flow to the limb. Following a leech bite, it has to establish a sucking pathway (extracellular matrix degradation); inhibit adhesion, aggregation, and coagulation (inhibition of platelet functions, and anticoagulant effect); increase blood flow; protect itself (antimicrobial activity); and avoid detection (analgesic and anti-inflammatory effects).<sup>3.</sup>

A few of the active principles of leeches are listed below -

#### Table<sup>4</sup>

Modes of action	Substance
Analgesic and anti-in-	Antistasin, hirustasin, ghilantens, eglin C, LDTI, complement C1 inhibitor, guamerin and
flammatory effects	piguamerin, carboxypeptidase inhibitor, bdellins, and bdellastasin
Extracellular matrix deg-	Hyaluronidase and collagenase
radation	
Increasing blood flow	Acetylcholine, histamine-like molecules
Inhibition of platelet	Saratin, calin, apyrase, decorsin
function	
Anticoagulant effect	Hirudin, gelin, factor Xa inhibitor destabilase, new leech protein 1, whitide, and whitmanin
Antimicrobial effect	Destabilase, chloromycetyn, theromacin, theromyzin, and peptide B

#### CONCLUSION

The study indicates that medicinal leech therapy has convincing potential in healing various types of chronic wounds. It is an effective, efficient, safe, and in-expensive way to bring about healing in chronic, non-healing wounds which also include diabetic foot ulcers. The therapy appears to work by venous decongestion, thrombolysis, blood and lymph flow enhancement, and the suppression of inflammation.

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