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Research Article

# ANALGESIC AND ANTI INFLAMMATORY EFFECT OF LEECH THERAPY (JALAUKAVCHARAN) IN THE PATIENTS OF OSTEOARTHRITIS (SANDHIGATA VATA)

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**ABSTRACT**
Osteoarthritis (degenerative joint disease) is the most common joint disorder. It mostly affects cartilage. The top layer of cartilage breaks down and wears away. Osteoarthritis is of two types, primary (idiopathic) and secondary. In idiopathic osteoarthritis, the most common form of the disease, no predisposing factor is apparent. Secondary OA is pathologically indistinguishable from idiopathic OA but is attributable to an underlying cause. The NSAID'S are main drug of choice in modern medicine which have lots of side effect therefore are not safe for long term therapy. Raktamokshan viz bloodletting is one of the ancient and important parasurgical procedure described in Ayurveda for treatment of various diseases. Of them, Jalaukavacharana or Leech Therapy has gained greater attention globally, because of its medicinal values. The saliva of leech contains numerous biologically active substances, which has anti-inflammatory, analgesic as well as anesthetic property. Keeping this view in mind we have started leech therapy in the patients of osteoarthritis and found encouraging results.
**KEYWORDS**: Osteoarthritis, Sandhigatavata, Leech therapy, Analgesic, Anti-inflammatory

## INTRODUCTION

Osteoarthritis also erroneously called degenerative joint disease, which mostly affects cartilage. Cartilage is the slippery tissue that covers the ends of bones in a joint. Healthy cartilage allows bones to glide over each other. It also helps absorb shock of movement. In osteoarthritis, the top layer of cartilage breaks down and wears away. This allows bones under the cartilage to rub together. The rubbing causes pain, swelling, and loss of motion of the joint. Over time, the joint may lose its normal shape. Also, bone spurs may grow on the edges of the joint. Bits of bone or cartilage can break off and float inside the joint space, which causes more pain and damage[1].

Osteoarthritis is of two types, primary (idiopathic) and secondary. In idiopathic osteoarthritis, the most common form of the disease, no predisposing factor is apparent. Secondary OA is pathologically indistinguishable from idiopathic OA but is attributable to an underlying cause[1].

Worldwide, osteoarthritis is the most common joint disorder. In western countries, radiographic evidence of this disease is present in the majority of persons by 65 years of age and in about 80 percent of persons more than 75 years of age. Approximately 11 percent of persons more than 64 years of age have symptomatic osteoarthritis of the knee

In Ayurveda osteoarthritis can be correlated with Sandhigatavata. The word Sandhigatavata mainly having two parts, Sandhi - Anatomical aspect and Vata - Physiological aspect of the body. Sandhigatavata is not described in eighty types of nanatmaj vata vyadhi[2,3] but it may be related to Vatakhuddata (pain in joint). However Sandhigatavata is accepted by Chakrapani as Gulphavata or Sandhigata Vata.

The NSAID'S are main drug of choice in modern medicine which have lots of side effect therefore are not safe for long term therapy. Raktamokshan viz bloodletting is one of the ancient and important Para surgical procedures described in Ayurveda for treatment of various diseases. Of them, Jalaukavacharana or Leech Therapy has gained greater attention globally, because of its medicinal values. The saliva of leech contains numerous biologically active substances, which has anti-inflammatory as well as anesthetic property. Keeping this view in mind we have started and evaluated the efficacy of leech therapy in the patients of osteoarthritis.

## MATERIALS AND METHOD

The study was randomized open phase clinical trial conducted at S.S.Hospital, BHU Varanasi under the Department of Kayachikitsa as per clinical guidelines.

### Plan of the Basal Study

The patients fulfilling the diagnostic criteria were selected for the study and interviewed thoroughly along with their family members and/or relative to obtain detailed information about the patient as well as the disease and collected in different data.

The total duration of treatment was fixed for six weeks with the regular weekly follow-ups. The patients registered for clinical study were advised, not to take any other drug during the trial period both internally and externally.

### Inclusion Criteria

1.The patients were clinically diagnosed according to Ayurvedic signs and symptoms.
2. Age-18 to 60 yrs.
3.Sex- Either
4.Marital status- Either
5.Socioeconomic status- All classes.

### Exclusion criteria

Patients diagnosed as arthritis suffering from
1)Tuberculosis ( of any system)
2)Infective pathology of any system.
3)Chronic renal disorders
4)Any life threatening disease.

Criteria for diagnosis: For Idiopathic Osteoarthritis of the Knee

### Classification-tree format

Knee pain and osteophytes on radiographs or Knee pain plus patient age of 40 years or older, morning stiffness lasting 30 minutes or less and crepitus on motion

**PROCEDURE FOR LEECH THERAPY (JALAUKAVCHARAN)**

**Selection of Leech (*Hirudo medicinalis*)**

Out of twelve, only six varieties of nonpoisonous leeches are used for medicinal purpose. Sankumukhi type of leech is preferably used for medicinal purposes due to its rapid blood sucking capacity. As per classical description of Ayurveda, Leeches used for the therapy were obtained from fresh water pond of medium size (4-6gms weight). Leeches were applied once in every week for three months duration.

**Storage and maintenance of Leech**

Leech should be stored in well labelled container having multiple pores on the top for proper aeration. Temperature should be maintained around 15-27º C. The water of container should be de-chlorinated and should be replaced after 5 to 6 day. About 50 leeches can be kept in one gallon (4 litters) of water. If it is not possible to get the de-chlorinated water then keep the container of chlorinated water open in the air for a period of time and then use it for storage of leech. It is better to avoid direct exposure of sun light to the leeches.

Preparation: To activate the Leeches as well as to make the skin of leeches antiseptic they were put in a bowl containing a solution of Haridra and water for a period of 15 minutes. Later on Leeches were cleaned by keeping them in another bowl of pure water for 15 minutes.

Position: The patients were advised to sit down in position of spreading both legs forward and sometimes in prone position when leeches were applied on affected joints.

Procedure: The posterior sucker of leech was held in one hand and anterior sucker was placed at site of application (maximum tenderness), where the leech was expected to be fixed. Thereafter, the posterior sucker was released from the hand & attached to the surrounding skin surface of the joint. Thereafter, the leeches were covered with wetted gauge piece. To keep it moist few drops of water were poured on & often. As soon as the leeches showed the sign of elevated head & pumping action of the anterior sucker region the time was noted, when the leeches got detached spontaneously or otherwise, the time was once again noted. After leeches get detached, the site of application was properly cleaned, thereafter, sprinkling of Madhuyasti powder was done followed by tight bandaging of the wound.

Precaution: With the onset of symptomps like burning, itching, pain etc., the leeches were removed by sprinkling Haridra powder or Saindhav.

**Contra indication of leech therapy**

1.Blood clotting disorder
2.Severe anemia
3.Allergic reaction to active substances of the leech like hirudin, calin, hyaluronidase, egline, kollagenage, apyrase, destabilase, piyavit etc.
4.Human with weak constitution.
5.Pregnancy.

**Precaution during leech application**

1.Bleeding and clotting time of the patient should be normal.
2.Gentle handling of leech.
3. Cover the leech with wet cotton.

**Frequency of Leech application**

The frequency of leech application will vary according to disease and severity. Generally Leech should be applied once in a week up to six sittings. One Leech should be reserved for a particular patient to avoid cross infection.

**Parameters of Assessment**

1.Estimation of pain by visual analogue scale (VAS)
2.By assessing other symptoms.
3.Radiological assessment.
4.Side effects of the leech therapy

**CRITERIA FOR THE ASSESSMENT OF RESULT**

To assess the efficacy of the therapy objectively, all the signs and symptoms were given score depending upon their severity. Gradation of signs and symptoms were as following:-

1. Gradation of Pain - Gradation of pain by visual analogue scale

0-1 No pain
2-3 Mild
4-5 Uncomfortable
6-8 Distressing
8-9 Intense
10 Worst possible

2.Gradation of Swelling

0 Nil.
1 Mild tenderness, causing patient to wince on digital pressure.
2 Moderate tenderness, causing patient to wince and withdraw on digital pressure.
3 Severe tenderness; patient does not allow to touch.

3.Gradation of Stiffness

0 Nil.
1 Mild.
2 Moderate.
3 Severe – All movements of leg impossible.

4.Gradation of Tenderness of joints

0 Nil, no tenderness
1 Mild, elicited on much pressure
2 Moderate, elicited on moderate pressure.
3 Severe, elicited even on slight touch.

5.Gradation of Restriction of Movement:

0 Absence of movement restriction
1 25% restriction of movement
2 25-50% restriction of movement.
3 <25% restriction of movement

6.Gradation of Crepitus:

0 Absence of crepitus
1 Mild, perception on touch
2 Moderate, audible on attention
3 Severe, clearly audible.

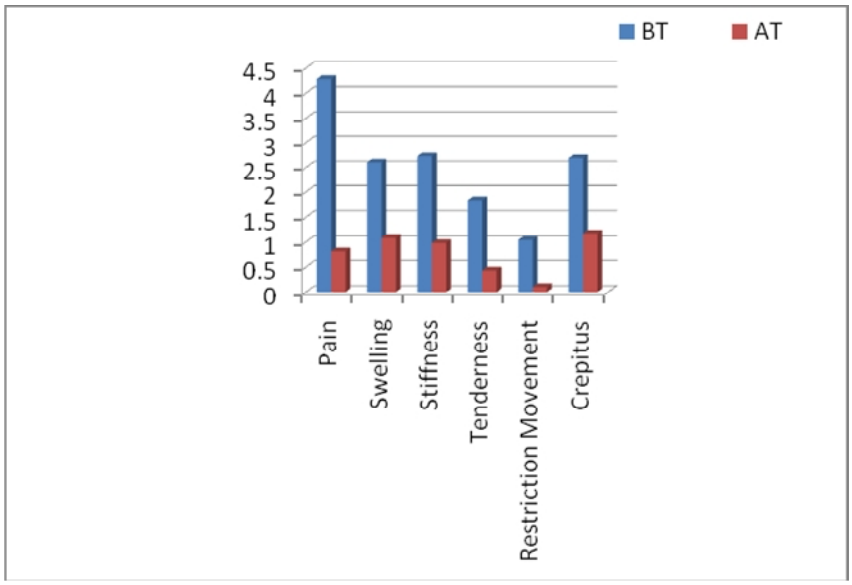
**OBSERVATION AND RESULT**

All statistical analysis is done by student unpaired t-test ‘p’ value <0.001 were considered to be statistically highly significant. The ‘p’ value >0.05 were considered to be non-significant. All the observations in reduction of symptoms and statistical analysis are given in table.

**Table 1: Showing the effect of therapy in patients of Osteoarthritis (Sandhigata-Vata)**

| Symptoms | Mean ± SD | | Paired t-test BT-AT |
|---|---|---|---|
| | BT | AT | |
| Pain | 4.28 ± 0.73 | 0.81 ± 0.64 | 3.47 ± 0.80 t=24.45 p<0.001 |
| Swelling | 2.60 ±0.50 | 1.08 ±0.27 | 1.52±0.54 t=20.21 p<0.001 |
| Stiffness | 2.73 ±0.49 | 0.98 ±0.54 | 1.75±0.76 t=16.52 p<0.001 |
| Tenderness | 1.83 ±1.20 | 0.43 ±0.63 | 1.42±1.13 t=9.11 p<0.001 |
| Restriction of Movement | 1.04 ±1.22 | 0.10 ±0.30 | 0.94±1.11 t=6.12 p<0.001 |
| Crepitus | 2.69 ±0.47 | 1.17 ±0.38 | 1.52±0.54 t=20.21 p<0.001 |

BT- Before treatment, AT- After treatment




**Graph 1: Showing the effect of therapy in patients of Osteoarthritis (Sandhigata-Vata)**

## DISCUSSION

The medicinal Leech is a beautiful symbol of give-and-take and is sustainable resource management. Hirudo medicinalis is one of the oldest surviving animals on earth. The first documented accounts of the use of Leeches for medicinal purpose is from the time of extreme antiquity, more than 2500 years before in Ayurvedic texts, then long later during the period of Hippocrates. Dhanwantari, the Indian God of Ayurveda holds a leech in one of his hands. This simply suggests the importance of leeches in medical field by ancient Indian sciences. Leeches have and will always be thought of as the "wonder doctors" of science.

Arthritis, also called degenerative joint disease. Gout is one of the type of arthritis, which is characterized by progressive loss of cartilage in the joints due to the deposition MSU crystals and is associated with symptoms such as pain, tenderness, stiffness and reduced mobility. Treatment often includes the use of non-steroidal anti-inflammatory drugs (NSAIDs) and topical analgesics[1]. This approach provides symptom relief but does not change the course of the disease.

Leech therapy may be more effective than topical analgesics and anti-inflammatory agents in the treatment of psoriasis4. Although leeches may not be safe for people with diseases that impair blood clotting or for those with compromised immune function, it is believed to be safe for most other people. Its immediate effect on pain, inflammation, lasting effects on stiffness and dysfunction; high degree of safety suggest that this therapy has great potential in the management of inflammatory disorders. Patients with psoriasis, who were treated with leech therapy, experienced clinically significant improvements in self-perceptions of pain and other symptoms for a limited period.

The saliva of leeches contains a variety of substances such as Hirudin, hyaluronidase, histamine like vasodilators, collagenase, destabilase[5], inhibitors of kallikrein, superoxide production and poorly characterized anesthetics and analgesic compounds[6]. These substances might reach deeper tissue zones and possibly the joint spaces. Various bioactive substances in leech saliva may also be as pharmacologically potent as hirudin and thus exert substantial effects in periarticular tissue and adjacent structures[7]. It has been proved through Laser Doppler Flowmetry that there is a significant increase in superficial skin perfusion following leech application, especially 16 mm around the biting zone[8]. Therefore, a regional analgesic and antiphlogistic effect by these substances enforced by hyaluronidase, as well as

counter–irritation might be the possible reason of improvement by treatment with leeches. Leech therapy could induce pain relief through antinociceptive effects and counter-irritation. However, it is not known to what extent leech bites may induce such mechanisms. The jaws of the leech pierce the skin so that these potent biologically active substances can penetrate into the deeper tissues. Hyaluronidase (spreading factor), an enzyme in leech saliva, further facilitates the penetration and diffusion of these pharmacologically active substances into the tissues. With the additive effect of hyaluronidase, it is highly probable that the antiphlogistic substances in leech saliva can penetrate deep enough to exert significant effects on periarticular myofascial structures and perhaps even on intra-articular structures.

Venous congestion is another important complication that threatens the viability of the affected areas. It can be best treated with the application of leeches. Leech therapy has two phases, active bloodletting and passive bleeding from the leech wound after detachment, which can last for several hours. The small blood volumes removed by medicinal leeches and the augment blood removal during the passive-bleeding phase of leech therapy results remarkably decrease in venous congestion in the joints. In addition to this, a broad number of anticoagulant agents decrease venous congestion such as the thrombin inhibitor hirudin, apyrase as well as collagenase, hyaluronidase, Factor Xa inhibitor and fibrinase I and II[9,10,11]

In summary, traditional leech therapy seems to be an effective in treatment for Osteo arthritis. The effectiveness and safety of this treatment, especially when applied repeatedly, should be further evaluated in larger randomized studies. In addition, the active compounds in leech saliva and their local release (that is, in the synovial fluid) deserve further study. Currently, no pharmacologic agent has similar lasting effects after a single local administration. Further research into the anti-inflammatory compounds of leech saliva could lead to the development of new effective substances for treating osteo arthritis.

## CONCLUSION

In the current study the treatment was found significantly effective in treating osteo arthritis. The effect of treatment was t=24.45 for pain; t=20.21 for swelling, t=16.52 for stiffness, t=9.11 for tenderness, t=6.12 for restriction of movement and t=20.21for crepitus.

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