

# A Conceptual View of Poisonous and Non-Poisonous Leeches in Ayurveda

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## Abstract

Leeches are being used by of human kind for centuries for treating many disorders. Though it is very useful tool and is propagating throughout the world as a special medical device, side effects of leech bites in some cases have been found from time to time. It is because of improper knowledge of non-poisonous and poisonous leeches. Sushruta's classification shows us the passage to the proper use of leeches for leech therapy. In this study, Sushruta's classification of leeches was compared and paired with that of phylum Annelida and was found effective in scientifically differentiating between non-poisonous and poisonous leeches.

*Key words:* Leech, Poisonous, Non-poisonous and Sushruta samhita

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Leech Therapy is one of the emerging medical therapies available these days. It has helped suffering humanity throughout the world with its healing power. It is not only useful in reconstructive and plastic surgery but also equally effective in wound healing, pain management, arthritis and skin disorders, etc. (Smoot *et al.*, 1995) Despite much of its advancement in the leech therapy with modern sterilization techniques, determination of non-poisonous and poisonous leeches is a big issue to deal with.

It is mentioned in Sushruta Samhita that poisonous leech bites can take the life of a patient and therefore it is necessary to identify the non-poisonous leeches prior to their application. Sushruta classified the leeches in two groups with their individual characteristics (*Sushruta Samhita, Sutrasthan-13*; Atridev, 1997) but due to improper light on this aspect of leech therapy, this matter needs to be re-emphasized with the deeper understanding of its clarification in the light of modern science.

Hence, a careful review of both ayurvedic and modern literature was done in this study and it was found that Sushruta's classification is based on the keen observation and experimentation and can be proved on modern scientific parameters.

## Methodology

A thorough exploration of three main Ayurvedic text books viz. Sushruta Samhita, Charak Samhita and Astanga has been done and amongst them Sushruta mainly describes the leeches in detail (*Sushruta Samhita, Sutrasthan- 13*; Atridev, 1997). The text book of 'Invertebrate Zoology' was looked upon for modern literature review (Jorden and Verma, 1979).

A detailed comparative study was done on the taxonomical and toxicological effects of leeches based on the characteristics defined in both Ayurvedic and modern literature. Similarities and dissimilarities among the kinds of leeches were assessed and analyzed and conclusion was reached.

## Review of Ayurvedic Literature

In Ayurvedic Samhitas, leech is described as *Jalauka*. It is called so, as water is their life and as their abode is water. Sushruta classified leech in two groups (i) Non- poisonous and (ii) Poisonous (*Sushruta Samhita, Sutrasthan- 13*; Atridev, 1997).

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Non-poisonous leeches are also of six types:

S.No.	Name	Characteristics
1.	<i>Kapila</i>	<i>Kapila</i> has flanks as if painted with realgar, smooth and color like that of green gram
2.	<i>Pingala</i>	<i>Pingla</i> is slightly red with round body, brown and swiftly moving.
3.	<i>Sankumukhi</i>	<i>Sankumukhi</i> is of livery color, swiftly sucking and with long and sharp mouth.
4.	<i>Musika</i>	<i>Musika</i> has appearance and color like that of rat and with disagreeable smell.
5.	<i>Pundarikamukhi</i>	<i>Pundarikamukhi</i> has color like that of green gram and mouth like that of lotus.
6.	<i>Savarika</i>	<i>Savarika</i> is smooth with color like that of lotus leaf and eighteen fingers in length.

Poisonous leeches again subdivided in six types:

S.No.	Name	Characteristics
1.	<i>Krishna</i>	<i>Krishna</i> has the color of antimony powder with big head.
2.	<i>Karbura</i>	<i>Karbura</i> is snake like and has abdomen depressed and elevated line over body wall.
3.	<i>Algarda</i>	<i>Algarda</i> is hairy and has broad flanks and black mouth.
4.	<i>Indrayudha</i>	<i>Indrayudha</i> has multicolor like that of rainbow.
5.	<i>Gochandana</i>	<i>Gochandana</i> is bifurcated in lower part like bull's scrotum and with small mouth.
6.	<i>Samudrika</i>	<i>Samudrika</i> is having whitish, yellowish and blackish line over body with flower like appearance.

According to *Astanga Samgrah*, there are only two varieties of Leeches, which are poisonous and non-poisonous. Poisonous leeches are red, white, black colored and irregular shape, slimy and rainbow like lines over body and hairy. These are found in ponds with dirty water having wastes and putrefying product of many animals. Non-poisonous leeches are greenish like that of algae color, little blackish, blue lines over round body and found in clean water (*Astanga Sangraha, Sutrasthan- 35*; Tripathi, 1999).

### Review of Modern Literature

Leeches belong to phylum *Annelida* which has three main classes that are:

S.No.	Name
1.	Hirudinea
2.	Oligochaeta
3.	Polychaeta

### **Hirudinea**

*Hirudinaria*, called Indian cattle leech, belongs to class Hirudinea which contains over 300 species of leeches. Leeches are the most specialized type of Annelids and have evolved from Oligochaetes (Jordan and Verma 1979).

Six common types of species of *Hirudinaria*

S.No.	Name	Characteristics
		The common Indian species (also common in Burma, Pakistan, and Ceylon) (Jorden and Verma 1979)
1.	<i>H. granulose</i>	Greenish with yellowish lines over body
2.	<i>H. viridis</i>	Greenish, brownish without line over body
3.	<i>H. nipponia</i>	Five longitudinal black border stripe over body
4.	<i>H. manillensis</i>	Greenish-brownish color with lines over the body
		The species outside India, common in Britain & Australia respectively (Robert <i>et al.</i> , 2001)
5.	<i>H. medicinalis</i>	Brownish black color with lines over the body
6.	<i>H. australlia</i>	More black color with lines over the body

*Hirudinaria granulosa* is the most common leech found in freshwater ponds, lakes, swamps and slow streams. It is sanguivorous (blood-sucking), sucking the blood of fishes and frogs, and also of cattle or human beings when they enter the pond. However, Leeches in general show a great diversity in their habits and habitat. Some species are marine and some live in fresh water, while others are terrestrial. Though many species are blood-suckers, a large number are not ecto parasitic but are predatory and feed on worms, snails and insect larvae. The body of leech is beautifully colored with characteristic markings. The dorsal surface is generally olive-green and the ventral surface is orange-yellow or orange-red and the two sides bear distinct stripes of orange or yellow and black. On the dorsal side is a median longitudinal black stripe. Body is also divided in segmentation for performing specialized functions (Jorden and Verma 1979).

**Oligochaeta**

There are more than 8000 species, among which Earthworm is the most common (Ruppert *et al.*, 2004).

**Polychaeta**

There are more than 9000 species, which are subdivided into two groups, *errentia* and *sedentaria*. *Errentia* are freely moving, while *sedentaria* species are sedentary in their life style (Rouse, 2001). Both Polychaeta and Oligochaeta have all the qualities of Annelida and therefore on gross level they look similar to each other. Sometimes it is difficult to identify these species separately. Most of the polychaetes are poisonous in nature (John *et al.*, 1996) and they are similar to leeches in their appearances:

## Poisonous Polychaetes:

S.No.	Scientific Name	Common Name	Characteristics
1.	<i>Ophiodromus flexuosus</i>	Bristle worm	Blackish with blue green stripe on body
2.	<i>Nereis pelagica</i>	Rag worm	Golden brown color with green tint, (6-21 c.m.)
3.	<i>Harmothoe extenuata</i>	Scale worm	Brown color (3-4 c.m.)
4.	<i>Lepidonotus clava</i>	Scale worm	Brown color (4-5 c.m.)
5.	<i>Arenicola marina</i>	Blow lug	Light green in color, found in sea
6.	<i>Nereis virens</i>	Nereis	Brown color, long with hair on body wall

**DISCUSSION**

These non-poisonous and poisonous varieties of leeches described in Ayurvedic literature and

modern scientific texts can be paired up based on their similarities in morphology, physiology and toxicological attributes.

**Non-poisonous leeches**

Most of the leeches in the class of Hirudinia are non- poisonous and they can be paired with classical Ayurvedic varieties as follows -

NON-POISONOUS LEECH		
Leech mentioned in Ayurvedic Samhita	Leech mentioned in Modern Literature	Similar characteristics
<i>Kapila</i>	<i>Hirudinea granulosa</i>	Green-yellowish with yellow lines over the body
<i>Pingla</i>	<i>Hirudinea medicinalis</i>	Brownish round body with lines over the body
<i>Sankumukhi</i>	<i>Hirudinea australis</i>	Liver colour (dark) with long head
<i>Musika</i>	<i>Hirudinea nipponia</i>	Dark colour like that of rat with black lines
<i>Pundarikamukhi</i>	<i>Hirudinea manillensis</i>	Green – brownish colour, mouth resembles lotus
<i>Savarika</i>	<i>Hirudinea viridis</i>	Green-brownish colour, long, no lines on the body wall

**Poisonous leeches**

Most of the species in the class of Polychaeta are poisonous in nature. Inside this class, there are specific kinds of Polychaetes which are colourful and poisonous in nature and are similar to those described in Sushruta's poisonous varieties of leeches, and therefore they can be paired up as follows.

POISONOUS LEECH		
Leech mentioned in Ayurvedic Samhita	Leech mentioned in Modern Literature	Similar characteristics
<i>Krishna</i>	<i>Lepidonotus clava</i>	Dark colour with similar body length
<i>Karbura</i>	<i>Nereis pelagica</i>	Snake like body, longest with lines over bodywall
<i>Algarda</i>	<i>Nereis virens</i>	Dark colour with hair on the body wall
<i>Indrayudha</i>	<i>Ophiodromus flexuosus</i>	Both are having vibrant colour over body wall
<i>Gochandana</i>	<i>Harmothoe extenuata</i>	Both are small and flat with brownish colour
<i>Samudrika</i>	<i>Arenicola marina</i>	Light body colour, reside in the sea

**CONCLUSION**

Non-poisonous leeches described by Sushruta Samhita are similar to those in the class Hirudinea of Annelida and poisonous leeches mentioned in Sushruta are the species of the class of Polychaeta. It is hoped that this study helps to open further experimental research on leech therapy.

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