

**RAKTAMOKSHANA BY SHRINGA YANTRA: A REVIEW****Gopal Singh<sup>1</sup>, Ajay Kumar Gupta<sup>2</sup>**

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The Father of Surgery, Acharya Sushruta, described several surgical and para-surgical techniques for maintaining a person's proper health as well as for curing a wide range of diseases. *Raktamokshana* is one of them, which is used to treat various illnesses caused by *Rakta Dushti*. *Raktamokshana* can be used as the first line of treatment for all diseases, as according to Astanga Sangraha, *Rakta* is the main *Dushya* (*Aashrya Sthana*) in all disorders. Among various methods of *Raktamokshana*, *Shringa Yantra* is a classic *Raktamokshana* technique used for curing mainly *Vataja Rakta Dushti* illnesses. The *Shringa Yantra* can help in the removal of *Rakta Dushti* by using a variety of mechanisms, such as bringing the *Panchmahabhootas* (elements) of *Rakta Dhatu* into balanced state, which is responsible for the various physiological functions of *Rakta Dhatu* when present in a balanced state, by the action of its properties, by eliminating *Srotas Dushti*, etc. So, an effort has been made in this paper to highlight the likely mode of action of *Raktamokshana* by *Shringa Yantra*, based on both Ayurvedic and contemporary explanations.

**Keywords:** *Raktamokshana*, *Panchmahabhootas*, *Shringa Yantra*

## INTRODUCTION

Ayurveda is the science of life that not only aims at the treatment of various disorders but also aims at maintaining the proper health of individuals. Mainly two ways of management have been described by acharyas i.e., *Shodhana Chikitsa* (purification therapy) in which elimination of excess *Doshas* from the body is facilitated and *Shamana chikitsa* (Palliative or Internal medicine), where the increased *Doshas* are brought into equilibrium with the help of various ayurvedic formulations<sup>1</sup>. Acharya Sushruta and Vagbhatta have described five types of *Shodhana* therapy i.e., *Vamana karma* (Therapeutic Emesis), *Virechana karma* (Therapeutic Purgation), *Basti karma* (Therapeutic Medicated enema), *Raktamokshana* (Therapeutic Bloodletting) and *Shirovirechana* (Therapeutic Nasal medication). *Raktamokshana* is one of these five *Shodhana* therapies described by Acharyas<sup>2</sup>, which is popularly used for the management of various ailments occurring due to *Rakta Dushti*. *Raktamokshana* should be used as the first line of treatment because according to Astanga Sangraha, *Rakta* is the main *Dushya* (*Aashrya Sthana*) in all diseases<sup>3</sup>. *Rakta Dhatu* is made of *Panchmahabhoota* which are responsible for its various physiological functions *Aakasha Mahabhoota* causes *Laghuta* (lightness), *Vayu Mahabhoota* causes *Spandana* (movement), *Jala Mahabhoota* causes *Dravata* (appropriate viscosity), *Teja Mahabhoota* cause *Raga* (redness) and *Prithvi Mahabhoota* causes *Vistra* (peculiar smell)<sup>4</sup>. So, in *Rakta Dushti* there will occur an imbalance in its *Pancha Mahabhautika Sangathana* leading to the appearance of various symptoms due to an increase in either one *Mahabhoota* alone or along with others. *Raktamokshana* will help in bringing them to a balanced state by removing *Dushita Rakta*. Acharyas have described two ways of *Raktamokshana* i.e., *Shastra Visravana* (using sharp instruments) and *Anushastra Visravana* (without using sharp instruments). *Shastra Visravana* can be further divided into two types i.e., *Pracchana* (scarification) and *Siravyadhana* (Venepuncture)<sup>5</sup>. *Anushastra Visravana* is also further divided into *Shringa*, *Jalauka* (leech therapy), *Alabu*, and *Ghati*

*Yantra*<sup>6</sup>. Among these *Shringa Yantra* is mainly used in *Vataja Rakta Dushti*<sup>7,8</sup> diseases and *Pittaj Rakta Dushti*<sup>8</sup> diseases.

### Description and Properties of Shringa Yantra

- *Shringa Yantra* means, the use of 'Go-Shringa' for the *Raktamokshana* procedure.
- *Go-Shringa* is of 18 *Angula* in length having two openings i.e., 3 *Angula* broad in its base and another one is of the size of a mustard seed (*Siddharthaka chhidre*) in its tip making its appearance like the shape of the nipple (*Chuchaka Akriti*)<sup>9</sup>.
- As per Astanga Sangraha, it is of three types as per length i.e., 8 *Angula* (*Hrasva*), 10 *Angula* (*Madhyama*), and 12 *angula* (*Dhirgha*)<sup>10</sup>.
- Acharya Sushruta has described its properties as *Snigdha Guna*, *Madhur Rasa*, and *Ushna Veerya*<sup>7</sup>.
- As per *Sharangdhara*, it can drain *Dushita Rakta* up to 10 *Angula* around the site of procedure<sup>11</sup>.

### Indications of Shringa Yantra

- *Vataj Rakta Dushti*<sup>7,8</sup> and *Twachasthita Rakta Dushti*<sup>12,13</sup>
- *Supta* and *Nishchetana Rakta Dushti*<sup>14</sup>
- *Sukumara* persons<sup>15</sup>
- Acharya Vagbhatta has also mentioned the use of *Shringa Yantra* in *Vata* and *Pitta Rakta Dushti*<sup>8</sup>

### Procedure<sup>16</sup> (Su. Sutra 13/8)

The patient is well informed regarding the procedure and his written consent is taken. Then the selection of the site is done, where *Shringa Yantra* is to be applied. After the selection of the site, small and shallow pricks are made on that area with the help of a sterile needle. Then *Shringa Yantra* is applied to that area and the air is sucked by mouth from another opening i.e., the tip of the *Shringa Yantra*. The air gets sucked out, which creates a vacuum inside it leading to the oozing out of *Dushita Rakta*.

### Mode of action –

Acharya Sushruta has considered *Rakta* as *Chaturtha Dosh*<sup>17</sup>, proving its significance in the emergence of many diseases. Similar to that Acharya Vagbhatta has also mentioned, *Rakta* is the primary *Dushya* (*Aashrya Sthana*) in all types of disorders<sup>4</sup>. As a re-

sult, *Raktamokshana* will aid in removing *Dushita Rakta* and *Dosha*, which will pacify various signs and symptoms caused by *Rakta Dushti*. Among various methods described by Acharyas for *Raktamokshana*, *Shringa Yantra* is advised for *Raktamokshana* in mainly *Vataja Rakta dushti*. *Raktamokshana* using *Shringa Yantra* gives therapeutic benefits in the following various dimensions: -

**Due to its properties**<sup>7</sup>: - As it possesses properties like *Snigdha* and *Ushna Guna* which are opposite to *Ruksha* and *Sheeta Guna* of *Vata Dosha* and have *Madhura Rasa* which also helps in the pacification of *Vata Dosha*. So, pacification of localised *Vata Dushti* will help in relieving pain and other symptoms occurring due to the involvement of *Vata* along with *Rakta*.

**By Direct removal of *Dushita Rakta* and *Dosha***: - As shallow pricks are given over the selected site which will lead to the oozing of *Dushita Rakta* and *Dosha*, which will be further aided by negative pressure which is created inside *Shringa* due to the sucking of air by mouth from the tip of it. Oozing of *Dushita Rakta* from the site of application and surrounding tissue due to negative pressure applied will occur up to 10 *Angula*<sup>12</sup> around the site of application. So, direct removal of *Dushita rakta* and dilution of *Dushita Dosha* will lead to the pacification of symptoms occurring due to them in that area.

**By Removing *Srotas Dushti***: - *Margaavrodha* of *Dosha* occurs due to vitiated *Rakta* in many diseases like *Vata-Rakta* (Gout). Doing *Raktamokshana* in those diseases will remove vitiated *Rakta* from that site which will help in the removal of *Margaavrodha* causing *Anuloma Gati* of *Dosha* leading to the pacification of various symptoms occurring due to their *Margaavrodha*.

**By Bringing *Panchmahabhootas* in a balanced state** - *Panchmahabhootas* are responsible for various physiological functions of *Rakta Dhatu* like *Aakash Mahabhoota* is responsible for *Laghuta* (lightness)<sup>4</sup> of *Rakta Dhatu* which can be understood as that it helps in keeping various components of blood separated from each other (*Viviktata*)<sup>18</sup> i.e., avoiding unnecessary aggregation of its various components which can cause various pathologies. So, in *Rakta*

*Dushti* this normal functioning of *Aakash Mahabhoota* is disturbed leading to the accumulation of its components e.g., the presence of clots in the blood, which can further cause many disorders. *Vayu Mahabhoota* help in *Spandana*<sup>4</sup> i.e., pulsatile movement of *Rakta Dhatu* throughout the body which in turn provides nutrition to every cellular component of the body. So, in *Rakta Dushti* this normal functioning of *Vayu Mahabhoota* is disturbed leading to poor tissue perfusion or stasis of blood causing various disorders like *Kotha*, Varicose veins, etc. *Agni Mahabhoota* helps in maintaining *Raga* (redness)<sup>4</sup> So, in *Rakta Dushti* this normal functioning of *Agni Mahabhoota* is disturbed leading to manifestations of symptoms like *Daha*, *Paaka*, abnormal discolouration, etc. *Jala Mahabhoota* helps in maintaining *Dra-vta* (appropriate viscosity)<sup>4</sup> So, in *Rakta Dushti* this normal functioning of *Jala Mahabhoota* is disturbed leading to either an increase or decrease in viscosity of *Rakta Dhatu* causing symptoms like *Shotha*, etc. Similarly, *Prithvi Mahabhoota's* function of maintaining *Visrta* (peculiar smell)<sup>4</sup> is disturbed in *Rakta Dushti*. So, there occurs an imbalance in these *Panchmahabhootas* (elements) in *Rakta Dushti* leading to the manifestation of symptoms either by a single *Mahabhoota* (element) or in association with other *Mahabhootas* (elements). *Raktamokshana* by *Shringa Yantra* will help in maintaining a balanced state by removing excess *Mahabhootas* (elements).

**By Breaking Skin barrier**<sup>19</sup> - Skin not only acts as a defence barrier between body tissue and the external environment but also has excretory functions. The skin excretes many drugs, heavy metals, chemicals, and endogenous toxic compounds. The skin has a drug-metabolizing function<sup>20</sup>, drug biotransformation function<sup>21</sup>, and antioxidant function<sup>22</sup> in addition to excretory functions. Skin barrier retards the excretion of accumulated toxins as seen in abscesses until there occurs spontaneous rupture, causing the removal of toxins along with pus. Similarly, it can be said that pricks given just before *Shringa Yantra* application break the skin barrier and helps in the removal of pathogenic undesired substances along with blood and also enhances skin excretory role leading to the

pacification of symptoms caused due by a localized collection of pathogenic undesired substances.

**Release of Nitric Oxide**<sup>23</sup> - An experimental trial reported increased expression of Nitric Oxide synthase, an enzyme which produces Nitric Oxide from L-arginine, and it was found higher around skin acupuncture points of rats<sup>24</sup>. So, pricks given in this procedure could cause the release of Nitric Oxide from endothelial cells, leading to certain beneficial biological changes. As Nitric Oxide (NO) is a signalling gas molecule that mediates vasodilatation and regulates blood flow and volume<sup>25</sup>.

**By drainage of interstitial fluid**<sup>19</sup> - As tissue fluids are filtered from the capillary walls to the interstitial spaces, which returns to the vascular system via the lymphatic system<sup>26</sup>. Metabolic by-products<sup>27</sup> and endogenous free radicals<sup>28</sup>, which are continuously formed inside cells are also excreted into the interstitial fluids in interstitial spaces. Based on that, in physiological conditions, the application of *Shringa Yantra* may have a preventive benefit by clearing interstitial spaces from any metabolic waste products, free radicals, or xenobiotics in interstitial fluids. In pathological conditions also, localization of pro-inflammatory substances<sup>29</sup>, inflammatory cells<sup>30</sup>, toxins, bacteria, and harmful biological or chemical substances<sup>31,32</sup> tends to occur at specific sites that differ according to disease type and pathological stage. So, the application of *Shringa Yantra* at those specific sites will help in removing these pathological substances.

**By Effect of Negative pressure**<sup>32</sup> - When *Shringa Yantra* is applied it causes centrally localized negative pressure, producing compression of the skin at the base of *Shringa*. The lowered pressure within the interior of the device causes a pressure differential between the skin surface and underlying blood vessels, eliciting almost immediate visible vasodilation of the superficial capillaries. Observations of Shirley et al. states that intravenous infusion of albumin caused capillary distension and increased maximally the porosity of the capillaries, leading to the conclusion that capillary pores can be stretched i.e., capillary pores are not rigid structures. Based on that, neg-

ative pressure suctioning in *Shringa Yantra* may stretch capillary pores and enhance fluid filtration and capillary blood clearance. So, drainage of interstitial fluids and filtered fluids through skin pricks removes them and decreases absorption of these fluids and their wastes through the venous end of capillaries.

**Heme Oxygenase-1 system Activation**<sup>32</sup> - As application of *Shringa Yantra* will produce localized hyperemia, which stimulates an increase in tissue blood flow and in the end as all the filtered localized blood will not be removed leading to the formation of ecchymosis. Ecchymosis attracts macrophages, which phagocytize the erythrocytes in the extravascular space which stimulates the production of Heme Oxygenase-1 (HO-1) to metabolize the heme. As human body removes haemoglobin from the tissue by macrophages and the production of the inducible enzyme heme oxygenase-1 (HO-1) which was identified in the 1960s<sup>33</sup>. Activation of the HO-1 enzyme system has been shown to have potent antioxidant, anti-inflammatory, anti-apoptotic and immunomodulatory effects throughout the body in the following ways -

- HO-1 increases the production of IL-10, an anti-inflammatory cytokine that stimulates the resolution of inflammation<sup>34</sup>. In an autocrine fashion, HO-1 production is upregulated by increased levels of IL-10<sup>35-37</sup>. While HO-1 increases IL-10, it simultaneously down-regulates the production of pro-inflammatory cytokines such as tumor necrosis factor (TNF) alpha and interleukin-6 (IL-6) and inhibits the effects of IL-1b<sup>38-40</sup>.
- Antioxidant enzymes such as Catalase and Superoxide Dismutase are significantly increased by the activity of HO-1<sup>41-43</sup>.
- HO-1 increases tissue levels of vascular endothelial growth factor (VEGF) and simultaneously stimulates mitochondrial biogenesis<sup>44-46</sup>. All of these effects would have a significant benefit in healing.

#### ***Rakta Dushti Lakshana***<sup>47</sup>

Ancient Acharyas have described various diseases occurring due to *Rakta dushti*. The following are common symptoms occurring due to *Rakta Dushti* as described by Acharya Sharangdhara.

- *Vedna* (pain)
- *Paaka* (Suppuration or collection of digestive and metabolic enzymes)
- *Daha* (Burning sensation)
- *Raktamandalta* (reddish patches over the skin)
- *Kandu* (Itching)
- *Shotha* (Inflammatory Swellings)
- *Pitikodgama* (Skin eruptions)

Among these *Vedna* can be considered mainly due to the dominancy of *Vata Dosha* along with *Rakta Dushti*. *Paaka*, *Daha*, *Raktamandalta*, and *Pitikodgama* can be considered mainly due to the dominancy of *Pitta Dosha* along with *Rakta Dushti*. *Kandu* and *Shotha* can be considered mainly due to the dominancy of *Kapha Dosha* along with *Rakta Dushti*. Based on these symptoms possible modes of action in relieving many diseases caused due to *Rakta Dushti* in various proportions can be explained as follows: -

#### **Possible action in Pacification of *Vedna* –**

- As per Ayurveda *Vedna* occurs due to the involvement of *Vata Dosha* as described by Acharya Sushruta<sup>48</sup>. So, *Raktamokshana* using *Shringa Yantra* will help in the pacification of *Vedna* by the pacification of *Vata* by the action of its properties and removal of *Margaavrodha*.
- In contemporary science also *Vedna* (Pain) has been described as an unpleasant sensory and emotional experience due to actual or potential tissue damage<sup>49</sup>. According to Pain Gate Theory (a mechanism in the spinal cord), pain signals can be sent up to the brain to be processed to accentuate the possible perceived pain or attenuate it at the spinal cord itself<sup>50</sup>. The ‘Gate’ is the mechanism where pain signals can be let through or restricted. Both large and small afferent nerve fibres carry sensory stimulus from the site of injury to the dorsal horn. Among them, small diameter fibres are activated by noxious stimuli i.e., Intense pain and temperature<sup>50,51</sup>, which further impends inhibitory cells, so it allows transmission cells activity leading to the opening of the gate followed by the perception of pain<sup>23</sup>. Whereas large diameter fibres are activated by non-noxious stimuli i.e., light touch, pressure, and vibration<sup>50,51</sup>, which further stimulate inhibitory interneurons leading to inhibition of transmission cell activity, causing the clos-

ing of ‘Gate’<sup>23</sup>. So, it is expected that when *Shringa Yantra* will be applied, it will cause a non-noxious stimulus (as there will be a mild increase in pressure inside the *Shringa Yantra* along with shallow pricks (not intense stimulus) given before its application will stimulate more large fibres leading to close of pain gate by increasing activation of inhibiting cells leading to reduction of pain.

- Moreover, the Pathogenesis of pain also includes interstitial hypertension and an increased number of neurotransmitters, such as substance P and its receptor, calcitonin gene-related peptide, and other neurotransmitters in afferent nerves<sup>19</sup>. Based on that, the application of *Shringa Yantra* at these localized sites may remove localized fluids, clear interstitial spaces, and decrease interstitial hypertension leading to the pacification of pain.

#### **Possible action in Pacification of *Daha*, *Paaka*, *Shotha* –**

- As per Acharyas, *Daha*<sup>52</sup> (Burning sensation) and *Paaka*<sup>48</sup> (Suppuration or collection of digestive and metabolic enzymes) occur due to the involvement of vitiated *Pitta Dosha* and as per Ayurveda *Pitta Dosha* have dominance of *Teja* (*Agni*) and *Jala Mahabhoota* so it can be said that these symptoms occur due to increase in *Teja* and *Jala Mahabhoota* (elements) of *Rakta Dhatu*. So, *Raktamokshana* by *Shringa Yantra* will help in the removal of *Dushita Rakta* as aforesaid by direct removal and negative pressure of *Shringa Yantra* leading to the removal of these excess *Mahabhoota* (elements) and bringing them in a balanced state in *Rakta Dhatu* leading to the pacification of symptoms.
- Moreover, as described above *Shringa Yantra* is of *Madhura Rasa* which also helps in the pacification of vitiated *Pitta Dosha*<sup>53</sup> and as there is no involvement of *Agni* like used in *Alabu Yantra* so, it will not increase *Pitta Dosha*.
- In Contemporary science also it is said that local burning sensation (heat), excessive redness, and *Shotha* (swelling) can occur as signs of inflammation which in the end can result in *Paaka* i.e., suppuration or collection of digestive and metabolic enzymes, occurring due to accumulation of various inflammatory mediators. So, when *Rak-*

*tamokshana* (bloodletting) will be done over that area it will lead to the elimination of these mediators leading to dilution of these mediators and will help in pacification of inflammatory signs due to direct elimination of inflammatory mediators by breaking the skin barrier, by the release of nitric oxide, due to effect of suction pressure created during the procedure and by activation of Heme Oxygenase-1 system mechanism. Moreover, dilatation of peripheral capillaries occurring due to the above-mentioned factors will lead to an increase in blood flow to that area which will further aid the healing of tissue in that area due to the availability of fresh blood.

## DISCUSSION

As told by Acharya Vagbhatta *Rakta* is the main *Dushya* in all disorders so, *Raktamokshana* can be 1<sup>st</sup> line of treatment for all disorders. It can be said that in *Rakta Dushti* there occurs an imbalance of *Dosha* and *Pancha Mhabhautika Sangathana* of *Rakta Dhatu* resulting manifestation of assorted aforesaid symptoms. Among many methods of *Raktamokshana*, the use of *Shringa Yantra* is more beneficial in the case of *Vataja* and *Pittaj Rakta Dushti* and avoid use in *Kapha Rakta Dushti* as in this method *Agni* is not used which may aid in *Raktamokshana* of *Skandita Rakta*, present in *Kaphaj Rakta Dushti*. *Raktamokshana* by *Shringa Yantra* can be beneficial due to factors like bringing the *Panchmahabhootas* (elements) of *Rakta Dhatu* into a balanced state (which are responsible for the various physiological functions of *Rakta Dhatu* when present in a balanced state), by the action of its properties, by eliminating *Srotas Dushti*, by direct removal of *Dushita Rakta* and *Dosha*, by direct elimination of inflammatory mediators by breaking the skin barrier, by the release of nitric oxide, due to effect of suction pressure created during the procedure and by activation of Heme Oxygenase-1 system mechanism. In *Twachasthita Rakta Dushti* also it can be more beneficial due more localized effect as mentioned above and as told by acharya *Rakta* is responsible for providing nutrition to all other *Dhatu*s or body tissues so, increased blood flow to

the affected site will ultimately promote healing of damaged tissue in that area. Moreover, it is also beneficial in normal physiological conditions by clearing interstitial spaces from any metabolic waste products, free radicals, or xenobiotics in interstitial fluids.

## CONCLUSION

Aforesaid are various possible ways of action of *Shringa Yantra* and it can be concluded that *Raktamokshana* by *Shringa Yantra* can be beneficial in both physiological as well as pathological states in a person.

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