

## AN APPRAISAL ON AYURVEDA PERSPECTIVES OF SHASHTI UPAKRAMA

Dr. Meena Alnewar\*<sup>1</sup>, Dr. Priyanka Deshpande<sup>2</sup>, Dr. Sharad Tripathi<sup>3</sup> and Dr. Nirmala  
Apturkar<sup>4</sup>

<sup>1</sup>Professor and HOD Shalyatantra Department, BMAM, Nandanvan, Nagpur.

<sup>2</sup>Associate Professor Shalyatantra Department, BMAM, Nandanvan, Nagpur.

<sup>3</sup>Asst. Professor Shalyatantra Department, BMAM, Nandanvan, Nagpur.

<sup>4</sup>Asst. Professor Sharir Rachana Department, BMAM, Nandanvan, Nagpur.

### ABSTRACT

*Ayurveda* is a holistic science of medicine and *Shalyatantra* is one of the branch amongst *Ashtanga*. *Shalyatantra* is of prime importance because there are many diseased conditions where only medication can not work effectively. *Shashti Upakrama* (Sixty procedures) deals with the management of *Vrana Shopha* (Inflammation), *Vrana* and the cosmetic repair of the formed scar. The management principles adopted for the wound management in the present modern science and the *Shashti Upakrama* mentioned by Sushruta are similar and Sushruta moreover lays great emphasis on the cosmetic repair of the formed scar and also mentions treatment modalities to prevent wound dehiscence and its recurrence. *Shashti Upakrama* is not only a

scientific method for the management of a wound/ulcer from the stage of abscess to the stage of a well formed, cosmetically acceptable scar but is a more advantageous methodology. This article is aimed to review classical aspects of *Shashti Upkrama*.

**KEYWORDS:** *Ayurveda, Shashti Upakrama, Sushruta Samhita, Vrana, Wounds.*

### INTRODUCTION

Surgery and Surgical procedures are the impartial part of medical field and a proper management of wound is very important to prevent further complications. Giving importance to the minutest details of the stages of wound healing, Acharya Sushruta has explained *Shashti Upakrama* for the management of a wound. It covers the management of abscess, the

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#### \*Corresponding Author

**Dr. Meena Alnewar**

Professor and HOD  
Shalyatantra Department,  
BMAM, Nandanvan,  
Nagpur.

created wound and even the scar formed so that in the process of healing even the cosmetic disfigurement is minimized.<sup>[1]</sup> Acharya Charaka has described thirty six *Vran Upakrama* in *Vran Chikitsa*.<sup>[2]</sup> Here an attempt has been made to understand these *Upakrama* in accordance to the classical and modern principles.

**Table no. 1: Vran Upakrama according to Acharya Sushruta<sup>[3]</sup> and Charak.<sup>[4]</sup>**

Sr .no.	Sushrut (60 Upakrama)	Charak(36 Upakrama)
1.	<i>Aptarpana, Alepa, Parisheka, Abhyanga, Sweda, Vimlapana, Upnaha, Pachana, Visravana, Snehana, Vamana, Virechana, Chhedana, Bhedana, Darana, Lekhana, Eshana, Aaharana, Vyadhana, Vistravana, Seevana, Sandhana, Peedana, Shonita Sthapana, Nirvapana, Utkarika, Kashaya, Varti, Kalka, Sarpi, Taila, Rasakriya, Avachurnana, Vranadhoopana, Utsadana, Avsadana, Mridu Karma, Daruna Karma, Ksharkarma, Agnikarma, Krushnakarma, Pandukarma, Pratisarana, Romsanjanana, Romapaharana, Bastikarma, Utter Bastikarma, Bandha, Patradana, Krimighna, Bhrimhan, Vishaghna, Shirovirechana, Nasya, Kavala, Dhoom, Madhusarpi, Yantra, Ahar, Rakshavidhi.</i>	<i>Shophaghna, Patana, Vyadhana, Chhedana, Lekhana, Pracchan, Seevana, Avpeedana, Nirvapana, Sandhana, Swedana, Shamana, Eshan, Shodhana Kashaya, Ropana Kashaya, Shodhana Pralepa, Ropana Pralepa, Shodhana Taila, Ropana Taila, Shodhana Ghrit, Ropana Ghrit, Bahyapatra Acchadana, Abhyantar Patra Acchadana, Bandhana, Pathya Bhojana, Utsadana, Ruksha Daha, Sneha Daha, Avsadana, Dhoop For Making Vran Hard, Lepa For Making Vran Hard, Dhoop For Making Vran Soft, Lepa For Making Vran Soft, Vran Avachurnan, Ropana Churna, Lomrohana</i>

**Brief explanation of Shashti Upakrama described in Sushrut Samhita<sup>[5]</sup>**

**Aptarpana**(fasting) -*Shashti upakrama* starts with *Aptarpana*, that means *Langhana*. *Langhana* is used probably to breake the pathology in very initial stage. As per Ayurveda classics, *Nija Vyadhi* start with the development of *Aama produced due to diminished Agni*, later on that after association with *Doshas* produces *vyadhi*. In case of *sophaa* when *Aam* associates with *Dosha* and brings them in *vidagdhavastha*, that cause *pakva sopha* leading to *puya* formation that require active and aggressive management. *Aptarpana* helps to improve the *Agni* and creates a barrier for pathological contents. **Alepa** (application of medicated paste)used for pacification of local inflammatory process. **Parisheka**(spray) mainly used for the *shamana* of local *kupita Doshas* and reduces sign and Symptoms of inflammation. *Parisheka* subsides mainly *Vedna* and *Daha* locally. **Abhyanga**(oiling)- with the help of *Abhyanga Srotorodha* might be relieved and opening *srotasa* at the site of *sophaa*. **Swedana**(fomentation) should be done in severe pain, indurated wound and hard wound. It

relieves pain. **Vimlapana** -with the help of finger tip, thumb, or with green stick softly rubbing at the site of *sophaa* that may work by dispersing the accumulated *Doshas* in the corresponding *srotas* so that *srotosangha* may be release and pathology may break. According to modern medical science, before developing a cutaneous abscess, mostly the focus lays in side any sweat gland, hair follicle root or close sebaceous gland, so *vimlapana* may help to open of mouth of that particular gland. **Upanah** is a form of *swedna*, which is used for the purpose to subside or aggravate the process of *Sopha Paka*. *Doshas* involved in *sophaa* are in *vidaghdhaavastha* so after *upanah*, *sophaa* will go under *pakvastha* and if *Doshas* are *avidagdh* then due to effects of *upanah*, the *Doshas* after *vilayana* circulate in to whole body. *Upanah* breaks the *Samprapti* of *sopha* and *sopha* subsided completely. **Pachana**- when *upanah* do not work properly and *sopha* neither subsided nor become *pakva*, *Acharya* Sushrut advice to use internal medicine. *Pachan* of *aam Doshas* by administering *pachana* drug by orally. If involved *Doshas* are *avidagdh* then with the use of *pachana* drug the local focus is broken and *Doshas* left free into blood stream. **Visravan** is a kind of *rakta mokshana* with the use of *Sringa*, *Alabu*, *jalauka* and *siravedha*. The vitiated (*Kupita*) *dosas* are removed from the site of *sopha* with the *rakta mokshana*. If *dosas* are present superficially/ skin then method of *rakta vishravana* should be done by *jalaukavcharana*. If *dosas* are little deep then *alabu*, *shringa* and *Prachan* should be used. If *dosas* are spread throughout body and deep seated, then method of bloodletting should be *Siravedha*. This may work as illuminating the *dosas* outside the body and diminishes the local sign and symptoms.<sup>[6]</sup> **Snehana** (internal use of ghee, oil etc), **Vamana** (emesis) and **Virechana** (purgation) are vital to remove the vitiated *Dosha* from the body and to set right the *Jataragni* (digestive fire) and *Dhatwagni*, which is very vital to improve the immunity of a person. The **Shodhana** (detoxification) of the body in turn normalises the vitiation of the *Dosha* and prevents recurrence of the wound (disease) as well. By these measures, generally the *Vranashopha* subsides and does not get suppured to cause a *Vrana*. Once suppured, Sushrutha explains certain surgical procedures for the incision and drainage of pus from the wound. When *Sroto Avarodha* is eliminated, venous return is re-established, the toxins are removed and thus their deleterious effects are eliminated. **Puyanirharana** (drainage of pus) is important procedure to clear the pathogens and toxins of inflammation from the area, so that they don't get strengthened and involve newer and farther tissues.<sup>[7]</sup> Thus, measures like *Darana* - incising upon the abscess with the use of medicines (not instruments), **Chedana** (excision), **Bhedana** (incision using instruments), *Lekhana* (scrapping), *Eshana* (probing), *Aharana* (extraction), **Vyadhana** (puncturing), **Visravana** (draining) and **Sivana** (suturing)

have been mentioned.<sup>[8]</sup> Once through the surgical procedures like *Darana*, *Chedana* etc. mentioned above if the abscess is completely drained and the created wound is cleaned, the wound can be sutured for early healing. When certain drugs in the form of ointments are used to cause the union of edges of the wound (non-surgically), it is termed as *Sandhana*. *Peedana* (squeezing) is a method of pressing the abscess area in order to cause *Puyanirharana*. When abscess is situated over a *Marmapradesha* (vital regions) where the usage of instruments is contraindicated or if the patient is not consenting to surgical procedure to drain the pus, then medicines are made into a paste and applied over the abscess leaving its mouth uncovered. Unlike other conditions, here *Lepa* is allowed to dry. As the *Lepa* dries it creates pressure over the abscess and thus squeezes out the pus from the abscess and draining it non-surgically. *Shonithasthapana* is a measure of arresting haemorrhage. During the process of incising and draining out the pus from the abscess, the surgical procedures may create varying intensity of haemorrhage. For this purpose, Sushruta has advocated *Shonithasthapana*. He has advocated mainly four methods to arrest haemorrhage i.e. *Sandhana* (drugs with *Kashaya Rasa* are used for the purpose of unification of the wound), *Skandana* (ice cold liquids used locally promotes coagulation), *Pachana* (ash of plants cause desiccation) and *Dahana* (cauterization causes contraction of blood vessels). Sushruta has considered *Rudhira* (blood) as the main support for the *Shareera* (body), the loss of which can destroy the body itself. After surgical drainage of the abscess, Sushruta has advocated *Shonithasthapana* measures. Further after the abscess has been drained and all the pus is removed and a wound is created. Sushruta has explained methods for cleansing (*Shodhana*) and healing (*Ropana*) of the wound. *Nirvapana* (irrigation with cold materials) helps to reduce *Daha*, *Paka* and other symptoms manifested. The process of inflammation ends with the drainage of pus. Any remnant symptoms like pain, bleeding, hemorrhage, hyperaemia etc is set right by this process of irrigation. The process carried out along with milk, ghee etc. for this purpose is one of the important methods mentioned. *Utkarika* is the application of semisolid pastes of *Vatahara Dravya* over the wound. The wound edges are prevented from becoming dry and hard by the application of *Utkarika*. ***Kashaya* (decoction), *Varti* (wick), *Kalka* (paste), *Sarpi* (ghee), *Taila* (oil), *Rasakriya* (semisolid extracts) and *Avacurnana* (dusting)** are procedures mentioned for the purpose of *Shodhana* and *Ropana* of the formed wound. Depending on whether cleansing (if the wound is unhealthy) or healing (if the wound is clean) is required; various drugs are used in these mentioned forms. For e.g. *Dashamoola Kwatha* is used for cleansing vitiated *Vata*, *Nyagrodhadi Kwatha* for vitiated *Pitta* and *Aragvadhadi Kwatha* is used for cleansing *Kapha* vitiation. Dusting of above drugs

is also mentioned when the wound is deep seated, foul smelling and covered with thick slough. Once the *Vrana* is *Shuddha*, *Ropana* is mentioned. For this purpose, *Madhu* and *Ghrita* is commonly used. The antibacterial activity of honey is mainly due to inhibins in honey. These inhibins consist of hydrogen peroxide, flavonoids, and phenolic acids, plus many other unidentified substances. The glucose content of honey and the acid pH (typically between pH 3 and 4) may assist in the bacteria-destroying action of macrophages. This chemical debridement action of honey, apart from accelerating wound healing, spares the necessity for surgical debridement under general anaesthesia. Ghee contains several saturated and unsaturated fatty acids which are capable of taking part in metabolic processes involved in healing of any wound. *Dhupana* (fumigation) is one of the unique methods mentioned for the removal of *Krimi* (microorganisms), *Kandu* (itching), *Ruja* (pain) etc. *Dhupana* with the fumes of ghee mixed with *Guggulu* (*Commiphora wightii*), *Vacha* (*Acorus calamus*), *Sarshapa* (*Brassica juncea*) etc. is mentioned. Fumigation was used for the purpose of elimination of any remnant infections from the site as well as to prevent the subsequent contamination of the created clean wound. Further onwards, Sushruta was clear that *Vaikrtpaha Chikitsa* needs to be implemented so that as the wound heals the scar formed would be minimal and cosmetically acceptable. *Utsadana* (elevation) and *Avasadana* (depression) are measures mentioned for increasing or decreasing the local granulation tissue so that the wound floor is maintained same as that of the surrounding tissue. Depressed wound floor or elevated wound floor would surely lead to an unacceptable scar area and hence various measures have been mentioned. *Mridu Karma* (softening) is a measure mentioned to soften the edges of the wound by the usage of *Vatahara* drugs in the form of pastes etc. or *Raktamokshana* -blood letting (using *Shruna*). This was a method mentioned to prevent callousness. The wound as it heals sometimes becomes chronic or callous which delays the wound healing and hence this measure is mentioned. Similarly, *Daruna Karma* (hardening) is mentioned when the wound becomes soft. Wounds having less tensile strength undergo dehiscence and thus wound healing gets delayed. This measure restored the tensile strength of the wound thus restoring the process of wound healing. *Kshara Karma* (application of caustics) is mentioned to be used when there is excessive raised, hard, indurated tissue or excessive slough over the wound area. As the wound heals, secondarily it may again get infected resulting in the formation of slough which is to be removed and for this purpose application of *Kshara* is mentioned. *Kshara* helps to debride the slough and also has action against *Staphylococcus*, *pseudomonas* etc, and thus is able to restore a clean wound and aid the healing process.<sup>[9]</sup> *Agnikarma* (thermal cautery) was mainly mentioned as

a measure to arrest **Raktasrava** (blood loss). After caustic application, or by any other reason, if there is haemorrhage from the wound, Sushruta has mentioned **Agnikarma** for the purpose of arresting haemorrhage.<sup>[10]</sup> **Krushna Karma** (blackening) is a procedure for darkening the light-coloured scar formed in the area and for this, **Bhallataka** is mentioned. **Pandu Karma** (lightening) is a procedure for reducing the colour of hyper pigmented scar to normalcy for which application of **Manjishta** (*Rubia cordifolia*), **Haridra** (*Curcuma longa*), **Daruharidra** (*Berberis aristata*) etc. is mentioned.<sup>[11]</sup> **Pratisarana** (anointing) is mentioned where in powder of hen's egg, **Mukta** etc is applied or rubbed over the scar when the scar formed is smoother than the surrounding skin. **Romasanjanana** (repilation) is a measure for re-growth of hairs when the hairs over the scar area are lost and causes cosmetic disfigurement. For this ash of **Hastidanta** (ivory) is mentioned to be used along with **Daruharidra** and goat's milk. **Romapaharana** (depilation) is similarly mentioned to remove any excess hair growth over the scar. Hairs act as a foreign body which can prevent the complete healing of the area or can be a source of infection as well. So, the hairs are removed using knife, scissors etc or by the application of **Bhallataka Taila** (oil of *Semecarpus anacardium*) with **Snuhiksheera** (latex of *Euphorbia nerifolia*) etc. **Basti** (therapeutic enema) and **Uttarabasti** (douching) are mentioned for the management of ulcers vitiated by **Vata**, those situated below umbilicus or in the genital regions. As the person is wounded he becomes weak and loses his strength. **Dhatukshaya** (loss of tissue) causes **Vataprakopa** (aggravation of **Vata Dosha**) which can cause wound dryness or dehiscence. **Patradana** (covering the wound with leaves), **Bandhana** (bandaging and splints) are mentioned to protect the wound, retain softness of the wound and support the affected limb so that the wound healing occurs completely. **Krimighna** (disinfection) measure helps to remove **Krimi** from the area and promote healing. Usage of **Ksharodaka** is mentioned along with various other measures. These measures basically remove the acidic media, remove any remnant slough and prevent the growth of microorganisms thus preventing any chance of recontamination of the healing wound. **Brimhana** (nourishing) measure is mentioned to improve the strength of the emaciated (due to the complications of the wound) person. **Vishaghna** (detoxification) measure is mentioned to remove the effects of **Visha** (poisons/toxins) in the body. For this purpose, Sushruta has mentioned various **Agadha** (antidotes) to be used internally and externally. These measures remove the pathogens and toxins which accumulate in the body as a result of the pathology of the wound. These toxins or **Amavisha** could contaminate and create recurrence of the wound or be a cause for any subsequent illnesses. **Shirovirechana** (cleansing the region above clavicle), **Nasya** (nasal medications) and **Kavaladharana** (gargling) are measures specifically

mentioned for the management of the wounds caused in the oral cavity, nose etc (regions above the clavicle).<sup>[12]</sup> *Madhu* and *Sarpi* (application of honey and ghee) is mentioned for early healing of wide wounds. Honey has the inherent capability to increase the formation of granulation tissue, stimulate tissue growth, and reduce oedema and inflammation. *Yantra Karma* (use of instruments) is mentioned for the purpose of removing any remnant *Shalya* or any slough or unhealthy tissue from the wound site and thus makes the area clean and causes the correct healing of the wound. *Ahara* (wholesome food) and *Raksha karma* (protective measures) are mentioned to prevent recurrence of the wound and to improve the immunity of the person. Patient is advised *Snigdha*, *Ushna*, *Laghu Ahara* (food which is unctous, hot and light) which can also maintain the *Agni*. The place where he stays for recovery (*Vranitagara*), was also advised to be fumigated with the fumes of ghee, *Guggulu*, *Sarshapa*, *Vacha*, *Hingu* etc so that the area is sterilized. Thus these 60 measures were mentioned for the purpose of achieving complete healing of the wound without complications and with minimal cosmetic disfigurement.<sup>[13]</sup>

## DISCUSSION

The stages through which a *Vrana Shopha* passes i.e. *Amavastha* (initial stage of inflammation), *Pachyamanavastha* (stage of further aggravation of inflammation) and *Pakwavastha*, till the formation of *Vrana*, the process of its healing, the complications which can appear during its healing was clearly understood by Sushruta. Thus, in these sixty measures, there are treatments which are mentioned for managing the *Vrana Shopha*, there are measures mentioned for managing the formed *Vrana* and most importantly there are measures mentioned for repairing the scar, so that it is cosmetically acceptable to the patient. The measures from *Alepa* to *Virechana* are basically from the point of prevention of continuation of the disease from the stage of *Vrana Shopha* to a *Vrana*. *Alepa* with various drugs when allowed to dry over the *Vrana Shopha* causes pressure effect over the area and thus help in the process of subsidence of the local oedema. *Snehana* and *Svedana* promote the circulation of fresh blood to the area. During the process of inflammation for the fight against antigens, the flow of antibodies, WBCs to the local area is of utmost importance.<sup>[14]</sup> *Snehana* and *Svedana* dilate the blood vessels, improve the oxygen availability to the tissues and also promote the inflow of antibodies to fight against the antigens. Meanwhile because of the increased flow of blood to the local area and accumulation of debris of the tissue destruction, the swelling increases. In order to reduce the swelling Sushruta has advocated the *Raktamokshana* measure. *Raktamokshana* measure either by *Jalukavacharana* or any other

method, reduces venous congestion, increases the blood flow to the area and thus not only reduces the oedema but also improves the blood flow to the area and thus reduces inflammation and further tissue destruction. *Vamana* and *Virechana* are advocated for the process of cleansing the body. The locally vitiated *Dosha* enter the circulation, vitiate the *Dosha* and *Dhatu* elsewhere and produce symptoms elsewhere and thus a local condition starts showing systemic features. Thus, to weaken the process of spread and strengthening of the *Dosha*, Sushruta has advocated the process of *Shodhana* either in the form of *Vamana* or *Virechana*. All these measures are for the process of subsidence of the *Vrana Shopha* in the *Amavastha* or *Pachyamanavastha* itself. In spite of all these measures, if the vitiation is strong and the *Paka* continues, then *Pachana* measure has been advocated so that the suppuration process is enhanced and the vitiated, dead tissues in the form of pus can be removed from the body thus relieving the patient of his discomfort and also preventing the vitiation of the deeper tissue (if the pus is not drained it can result in the formation of a *Nadi Vrana - Sinus*).

Once *Paka* occurs, for the drainage of the collected pus, Sushruta has advocated *Darana* or any one of the *Ashtavidhashastrakarma* (8 main surgical procedures) as necessary. It is important to note here that he has explained both surgical and non-surgical procedure for the drainage of pus. In people who are not very comfortable with the surgical procedures, he has explained the application of the paste of certain drugs which can cause the drainage of pus and for others he has explained the surgical procedures. Thus, Sushruta was a very practical surgeon and has explained all the methods required for the drainage of pus depending on the type of patient we get in our clinical practice. Once the Incision and Drainage has been done, in order to squeeze out the pus from the surrounding area, he has explained *Peedana*, where in the surgeon physically applies pressure and removes the pus. He has also explained *Lepa* (the applied paste has to be left to dry) which does the same action of squeezing out the pus - more importantly painlessly. As the process of drainage involves surgical incision etc, the damage of tissues is certain and haemorrhage can be one of the complications which a surgeon has to face. For overcoming this complication, Sushruta has explained four methods – *Sandhana* (joining), *Skandana*, *Dahana* (cautery) and *Pachana*; methods which either hasten coagulation or decrease blood flow to the area or help in the union of edges of the formed wound and thus arrest haemorrhage. In spite of the above four measures, if the haemorrhage fails to cease, then he has advocated the *Seevana* (suturing) measure by which the bleeder can be ligated and the cut edges can be brought together and thus the wound can

be healed by primary intention. As the pus gets drained and a wound gets formed, the process of maintaining the wound clean gains great importance. The drugs mentioned for the purpose of *Vranashodhana*, used in the form of *Kashaya*, *Lepa*, *Parisheka* etc., basically are of *Kashaya Rasa* and are *Krimighna* in action.

## CONCLUSION

Ayurveda is the science of life. Shalya Chikitsa is the authorization of Ayurveda given to mankind and Acharya Sushruta is well known as father of surgery. In shalyatantra, Vran is the most important topic and commonly found diseased condition in shalyatantra opd. Sixty *Vran Upakrama* described by Acharya Sushruta are immensely scientific and acceptable in today's era too. *Shasti Upakrama* should be practiced and implemented for the betterment of *Vran*. *Shashti Upakrama* has a great role in curative as well as cosmetic aspect in *Vran Chikitsa*.

## REFERANCES

1. Vd. Anantkumar Shekokar, Textbook of Shalyatantra part 1, Shantanu publication, Pune, second edition 2010, pg no. 55.
2. Agnivesha: Charakasamhita with Vidyotani Hindi commentary by pt. Kashinath Shastri and Dr. Gorakhnath Chaturvedi, reprint 1998. Chaukhambabharati academy publication, Varanasi, Volume 1, Charak Chikitsasthan 25/43.p.322.
3. Sushruta Samhita, edited with Ayurveda Tatva Sandipika by Kaviraja Ambika Dutta Shastri Chaukhambha Sanskrit Sansthan, Chikitsa sthanam chapter 1 /8, p4.
4. Agnivesha: Charakasamhita with Vidyotani Hindi commentary by pt. Kashinath Shastri and Dr. Gorakhnath Chaturvedi, reprint 1998. Chaukhambabharati academy publication, Varanasi, Volume 1, Charak Chikitsasthan 25/43.p.322.
5. Sushruta Samhita, edited with Ayurveda Tatva Sandipika by Kaviraja Ambika Dutta Shastri Chaukhambha Sanskrit Sansthan, Chikitsa sthanam chapter 1 /8, p4-10.
6. Sushruat Samhita, edited with Ayurveda tatva Sandipika by Kaviraja Ambika dutta Shastri, Chaukhambha Sanskrit Sansthan, sutra sthanam chapter 17/6 p-71.
7. Madigan, Michael T. and Martin, John M. Brock Biology of Microorganisms 11th ed. Pearson Prentice Hall. USA. 2006: 734.
8. Sushruta Samhita, edited with Ayurveda Tatva Sandipika by Kaviraja Ambika Dutta Shastri Chaukhambha Sanskrit Sansthan, sutra sthanam chapter 36/10-11, p138.

9. Acharya Susrutha, Susruta samhita with Nibandha Sangraha commentary of Dalhana acharya edited by vaidya Jadavji Trikamji, chaukamba sanskrit samsthan, varanasi, Reprint 2012. Sutrasthana 7/15-16, 12/3-39 Page No.34 and 50-55.
10. A manual of Kshara sootra karma by Prof. R.C Arya. chapter 8 p-118.
11. Sushruta Samhita, edited with Ayurveda Tatva Sandipika by Kaviraja AmbikaDutta Shastri Chaukhambha Sanskrit Sansthan, sutra sthanam chapter 12/10, p39.
12. Sushruta Samhita, edited with Ayurveda Tatva Sandipika by Kaviraja Ambika Dutta Shastri Chaukhambha Sanskrit Sansthan, sutra sthanam chapter 14/39, p55.
13. Vd. Anantkumar Shekokar, Textbook of Shalyatantra part 1, Shantanu publication, Pune, second edition 2010, pg no. 55.
14. <https://www.Healio.com>- components of the immune system. Retrieved on dated- 12/07/2020.