



SUTURE MATERIALS AND SUTURE TECHNIQUES IN AYURVEDA – A REVIEW ARTICLE

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ABSTRACT

Seevan Karma (suturing) is the closing method of surgical or traumatic wound and also last step of every operative procedure. Among these *Seevan Karma* of prime importance as appropriate suturing with specified thread and needle leads to fast wound healing and minimized scar formation after surgery. *Acharya Sushruta* described the basic tents of experimental operative surgery for surgical training. The great need of such a training and describes the methods of experimental surgery using artificial objects (Non-living things) for learning the operative procedure like suturing². In suturing or *Seevan Karma* using appropriate principals and instrument also describing the indication, contraindication and method (*Poorva Karma* – preoperative procedure, *Pradhan Karma*- main procedure, *Paschat Karma*- post suturing procedure).

Keywords: *Seevan Karma, Sutra, Needle, Kartari*

INTRODUCTION

Sushruta Samhita is one of the classic *Brihatrayi* texts of *Ayurveda* attributed to *Sushruta* and *Nagarjuna* as *Sushruta Samhita* deals with anatomy, human cadaver dissection, experimental operative surgery and deliberates on many contexts of contemporary interest such as plastic surgery, *Udarpatan* (Laprotomy), arthopedic surgery, renal calculus surgery and other various operative procedure. *Acharya Sushruta* has described the *Asthavidha Shastra Karma* like *Chhedana* (Incision), *Bhedana* (Excision), *Lekhana* (Scraping), *Vyadhana* (Aspiration), *Eshana* (Probing), *Aharana* (Extraction), *Sravana* (Evacuation), *Seevan* (Suturing) in *Samhita*¹. *Seevan Karma* (Suturing) is the final step of every operative procedure. *Seevan Karma* is one of the *Ashtavidha Shastra Karma* described by *Acharya Sushruta*. Our texts have very good idea of absorbable and nonabsorbable suture. These suturing materials used in the various surgical procedures for closure of wound as preventive, curative an effective and economical mentioned in *Sushruta Samhita*. The natural suturing materials are more compatible to the tissues of the body and helps in quick healing of wound with minimal or negligible scar formation. Various types of needles used in modern surgery which mentioned in our texts. The *Acharya Sushruta* described in detail the surgical care of patients with *Purva-Karma*, *Pradhana Karma* and *Paschat Karma*. *Acharya Sushruta* had given a complete knowledge of wound healing and various techniques of wound healing according to wound types.

Aim and Objectives-

1. To evaluate and elaborate and co-relate the various suturing techniques described in *Sushruta Samhita* and other textbooks of *Ayurveda*.
2. To evaluate and elaborate the suturing materials described in *Sushruta Samhita* and other textbooks of *Ayurveda*.

Material and Methods- All references are collected and compiled from *Ayurvedic* textbook like-*Sushruta Samhita*, *Dalhanteeka*, and *Haran Chandra Teeka* on *Sushruta Samhita*, *Charaka Samhita*, *Astanga Hridaya* and *Astanga Sangraha* etc. *Seevan Karma* (suturing method).

Suture Material – Suture material is medical device used to keep wound together until they healed themselves by natural fiber (Collagen) Suture application generally involves using suture needle with an attached thread. A various shape and size of needles and different origin of thread were first time described by *Acharya Sushruta*.

Quality of suture material – Thin, fine, uniform and tensile strength³

Type of suture material - Non-absorbable suture⁴ – Plant origin⁴ –

Bark of *Ashmantak* (*Bauhinia Racemosa*), Thread of *Shana* (*Corchorus Capsularis*), Fibre of *Murva* (*Marsdenia tenacissima*), *Guduchi* (*Tinospora Cardifolia*), Cotton (*Gossypium Herbaceum*), *Kshaum* or Linen – (*Linum usitatissimum*)

Animal origin – Hairs (Non-absorbable monofilament suture)⁴, Horsehair (Non-absorbable monofilament suture)⁵.

Metallic (Inorganic Nature) -

Acharya Vagabhatta described the specific bandage made of copper, iron (Stainless steel), tin and lead should be given in wounds having more fat and *Kapha Dosa*⁶. Sutures are all metallic in modern surgery commonly used inorganic wire mainly used in orthopedic surgery ex. Stainless steel wire, silver wire, copper wire gold wire etc.⁷

Absorbable Suture –

All absorbable threads are of animal origin and they are absorbed by the body. Example- *Snayu* (ligament or tendon)⁸, Head of black ant.⁹

Head of black Ant- In intestinal obstruction surgery, after removal of foreign body, the intestinal exudate cleaned, the cut ends of the intestine are brought closer and got bitter by big black ants, after they have stuck up well the ants body is then twisted off leaving the head in place. Afterwards the abdomen should be sutured as described earlier⁹.

Suturing Needles- The suture needle allows the placement of the thread within the skin or tissue, carrying the thread with minimal trauma. The *Acharya Sushruta* has described the suturing needles of different shape for different purposes.¹ Needles are mainly classified

based on the basis of its curvature curved needle (*Dhanurvakra*)¹⁰ and straight needle¹¹ and depending on the basis of edge *Vrutta* – Round body¹⁰ & *Tridhar* (triangular) and cutting body¹⁰. These are classified as Traumatic (Eyed needles) and Atraumatic (Eyeless needle) on the basis of its eye. Traumatic needles commonly used in ancient surgery^{10,12}. While based on the length of needle these are classified as two finger breadths, three finger breadths and two and half finger (*Dhanurvakra*)¹³.

Part of Needle –

Tip - *Tikshna* or pointed tip *Breehimukha* shape¹⁰, Body- Stalk of *Malti* flower shape triangular¹⁰, Eye - An eye at the blunt end through which the suture material is threaded. “*Sutraanusarineemsuchi*”¹⁴

Indication the use of different type of use of needle-

- Round body (stalk of *Malti* flower) two finger breadth's needles – They are used where the approximation of thin tissue (soft and easy splitting of tissue) and in the joints.¹⁰
- Triangular, straight and three finger breadth's needles- They are used where the approximation of tough and dense tissue.¹⁰
- Curved needles – They are used at vital places, scrotum, stomach, intestine, and other abdominal viscera.^{10, 13}

Kartari (Scissors) – *Acharya Vagbhata* has described as a pair of scissors used by the barbers for clipping hair and is said to have been necessary for dividing the ligaments, hairs and threads.¹⁵

Suturing Training (*Yogya Karma*) – Before proceeding to suturing (*Seevan Karma*) on the human being, the student should be made to practice experimental suturing or other surgical procedure. One who has not practiced experimental surgery or suturing remains incompetent for surgical procedure even though a student may be well theoretical knowledge. *Acharya Sushruta* had advocated various experimental modules for surgical procedure. The experimental suturing should be done by using on the borders of fine or thin and thick cloths, soft leather.¹⁶

Indication of suturing^{04, 17}

Suturing should be resorted to the case of an open wound, at places where the rich adipose tissues, incised

and scraped wounds, fresh wounds (Traumatic and Surgical wounds), wounds around the movable joints.

Contraindication of suturing^{-04,17}

Infected wound, wounds caused by caustics (Alkali), fire (Burn wounds), poison, those wounds from which air (gas) come out, those having internal bleeding (Stab abdominal injury) & presence of foreign body are not to be sutured.

Type of suturing –

The kinds of sutures are four *Vellitaka* (Simple continuous suture), *Gophanika* (Blanket continuous suture), *Tunnasevani* (Subcuticular continuous suture), *Rijugranthi* (Simple interrupted suture) their natures is implied in their names and are to be employed as found appropriate to the nature of the wound.¹⁰

Method of Suturing –

General principle–

- Wound toilet before suturing- If dust, hair, nail and loose bone pieces etc. remain unrestricted from the wound, they cause severe suppuration and different type of pain; hence proper wound toilet should be done in them.⁴
- Trimming of wound edge- If the wound is lacerated then edge of the wound should be trimmed regular and uniformly.¹⁸
- Good blood circulation- If the edges of a wound are completely devoid of blood supply. They are slightly scrap till they bleed (Closed blood capillaries pore will be open after scraping). When bleeding occurs then suturing should be done. Blood helps in healing of the proper approximated wound edges.¹⁹

Suturing procedure -After cleaning the edges of the wound should be raised and brought into apposition with each other properly and then sutured with needle and fine thread.¹⁰

Precaution during suturing –

1. Suturing should not be done too far from the wound edge because if it is sutured at a far that will be painful in the edge of the wound.¹⁰
2. Suturing should not be done too near the wound edge because if it is suture too near, it would cut through the edge of the wound.¹⁰

3. Suturing should be done after stoppage of bleeding, so for stoppage of bleeding measures should be taken first.²⁰

Suture knot application – Suture knot should be tied uniformly right or left side of the wound edge and knot should not be applied over the wounds edge.^{21, 22}

Post suturing procedure –

After proper suturing it should be well covered by sterilized linen or flax fibers cloths (*Alsi* or *Kshaum* cloths) and cotton then powder of *Priyangu* (*Callicarpa macrophylla*), *Anjana* (*Hardwickiabinata*), *Madhuka* (*Glycyrrhiza glabra*), *Lodhra* (*Symplocos racemosa*) should be sprinkled around the wound or else powder of *Sallaki* fruits (*Boswellia serrata*) or ash of *Kshaumvastra* (*Alsi Vastra* or Flax cloth) may be sprinkled. Then the bandage should be applied, and necessary postoperative instruction given.^{10,23}

Advantage of closer of wounds- Early healing of wounds, less pain and less scar (Linear scar) formation, no discoloration.^{24,25}

Scar (*Vranavastu*)-As the scar of a wound never disappears even after complete healing and as its imprint lifelong.²⁵

DISCUSSION

Acharya Sushruta is the first Indian surgeon which described the various suturing materials, suturing techniques in details. Various suturing materials which used in ancient times like *Guduchi*, *Murva*, hairs, cotton and linen thread were easily available and economical. These materials are natural origin thus may create less tissue reaction. Various types of *Suchi* (Needles) are described in our texts. A surgeon skilled is the art of using surgical instruments in practice. *Acharya Sushruta* had advocated to suturing training before proceeding on the human being for proper wound healing and avoids extra time & efforts proper suturing should be done. So, with the proper correct suturing save the wound to be infected and the wound will stop bleeding by applying pressure effect over small vessels and facilitate improve healing & decrease scar formation. Suturing is contraindicated in the infected wound resulting infected wounds takes more time in healing. The described suture materials in our texts can be utilized if

processed and prepared according to modern scientific interventions.

CONCLUSION

We can conclude that our *Acharyas* were very much aware about management of wounds. *Acharya Sushruta* had given a complete knowledge of suturing procedure, needle and suturing material. Everyday new innovations are happening, but basic principles remain always unchanged that's why in modern day we follow the *Acharya Sushrut's* principle for the closure of wound.

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