



World Journal of Pharmaceutical Science & Technology

Journal homepage: www.wjpst.com

Review Article

A CONCEPTUAL STUDY OF ANCIENT SURGERY IN AYURVEDA

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Received: 02-04-2024, Revised: 01-05-2024, Accepted: .03-06-2024

DOI

ABSTRACT

Ayurved science of life which is divided into 8 branches. *Shalya* (Surgery) is one of the branches of *Ashtanag Ayurved*. From ancient Indian surgery various surgical procedures were divided in *Chhedya, Bhedyo and Vedhya*. There are about 15 types of surgical repair of the ear is mentioned in *Sushruta Samhita*: - 1. *Nemisandhanaka* 2. *Utpala Bhedyaka* 3. *Valluraka* 4. *Asangima* 5. *Ganda Karna* 6. *Aharya* 7. *Nirvedhima* 8. *Vyayojima* 9. *Kapatasantdhika* 10. *Ardhakapata Sandhiaka* 11. *Sanksipta* 12. *Hinakarna* 13. *Vallikarna* 14. *Yasti Karna* 15. *Kakaustaka*. Description of *Sandhan karma* found in ancient times. Reference of Magical operative surgery of *Ashwinikumaras* mentioned in Vedas. According to *Upanishad*, *Ashwinikumaras* also operated and repaired the excised head of *Yagyana* by *Rudra*. *Ashwinikumaras* were doing both homo and hetero transplantations at that time. *Sushruta* has described 15 methods of *Karna-sandhan* (Auroplasty) repairs of the several ear-lobes. The concept of practical training mentioned in *Yogyo soothreeya adhyaya* is still relevant. Before entering in the field of practice, the training at internship serves the same purpose which was proposed by *Sushruta* years back. *Sushruta* was the first person to classify surgical procedures in three divisions. 1. *Purva karma* (pre-Operative procedures) 2. *Pradhana karma* (Operative procedures) 3. *Paschat karma* (post-Operative procedures). 1. *Poorva Karma* (Preoperative procedures) :- *Acharya Sushruta* has mentioned in detail about the materials to be collected before any surgical procedures, which includes instruments and other preparations. 2. *Pradhana Karma* (Operative procedures) *Aacharya*

Sushruta has classified basic surgical procedures into eight types viz., **Chedana (excision), Bhedana (incision), Lekhana (scrapping), Vyadhana (puncturing), Eshana (probing), Aharana (extraction), Visravana (drainage) and Seevana (suturing).** 3. **Paschat Karma (Post-Operative)** *Acharya Sushruta* has given an extensive knowledge about post – operative care. He has mentioned that the patient should be sprinkled with cold water; wound should be pressed all around with finger, gently massaged and washed with *Kashaya*. Many of the techniques used in recent era of recon-struction surgeries were mentioned by *Acharya Sushruta* in *Sushrut Samhita sutrasthan* in different reconstructions of ear, nose and lip. This extraordinary knowledge indicates the greatness of our *Acharyas*, and we have to do research on their treatment modalities. The *Chikitsa* of *Asthi* and *Sandhi bhagna* was described by *Sushruta* under heading of *Bhagna*. The concept of physical rehabilitation after full recovery from the fracture and dislocation is followed by Orthopaedic surgeons and has now become a new branch known as physiotherapy.

KEYWORDS: Ayurveda, Paschat Karma, Poorva Karma, Pradhan Karma, Shalya-Vidhi.

INTRODUCTION

Ayurved science of life which is divided into 8 branches. *Shalya* (Surgery) is one of the branches of ***Ashtanag Ayurved***. *Sushruta* is considered as father of modern surgery, because of his logical approach and marvelous presentation in surgery. From ancient Indian surgery various surgical procedures were divided in ***Chhedya, Bhedya and Vedhya***. *Chedankarma* was performed in those disease where suppuration is absent, swelling is hard and immovable or in those diseases where gangrene develops. In the Vedic rituals, the knowledge of Plastic and Reconstructive surgery was known to *Bramha, Vishnu, Maheshwara, Indra, Dhanwantari, Aswini Kumaras* and *Dadhichi e.t.c*. *Daksha* cut the head and trunk of *Rishi Chyavan*, then *Ashwini Kumaras*, performed the first plastic surgery on re-uniting the severed head and thus gave back life to *Rishi Chyavan*. There are about 15 types of surgical repair of the ear is mentioned in ***Sushruta Samhita***: - **1. Nemisandhanaka 2. Utpala Bhedyaka 3. Valluraka 4. Asangima 5. Gandakarna 6. Aharya 7. Nirvedhima 8. Vyayojima 9. Kapatasandhika 10. Ardhakapata Sandhiaka 11. Sanksipta 12. Hinakarna 13. Vallikarna 14. Yasti Karna 15. Kakaustaka.** Reconstructive surgery techniques were being carried out by *Sushruta* that made important contributions to the field of plastic and cataract surgery. Description of *Sandhan karma* found in ancient times. Reference of Magical operative surgery of *Ashwinikumaras* mentioned in Vedas. Lord *Shiva* cuts the head of *Ganesha*, later on which is replaced with head of elephant. After that event *shree Ganesha* is known as “*Gajanana*”. The lost part of body of *Rishi Atriwas* was re-joined by *Ashwinikumaras*. The body of *Acharya Shyaba* was cut into three parts and then *Ashwinikumaras* immediately re-joined all parts and give him life. *Bhairav* cut the head of *Brahma* and *Dadhichi*. *Ashwinikumaras* re-joined their head. They also transplanted the head of *Yahnya*. *Dadhyancha* was the master of *Madhu Vidya*. *Ashwinikumaras* showed them interest in learning of *Madhu Vidya*. So they cut head of *Dadyyancha* and kept separate. Then they transplant the head of horse to the body of *Dadhyancha* and learnt *Madhu Vidya* from them. After learning *Madhu Vidya*, they transplanted his own head. *Dakshya* cut head and trunk of *Chyavan*. *Ashwinikumaras* performed the first

plastic operation to join them. According to *Upanishad*, *Ashwinikumaras* also operated and repaired the excised head of *Yagyana* by *Rudra*. *Ashwinikumaras* were doing both homo and hetero transplantations at that time. *Sushruta* has described 15 methods of *Karna-sandhan* (Auroplasty) repairs of the several ear-lobes. The concept of practical training mentioned in *Yogya soothreeya adhyaya* is still relevant.

AIMS AND OBJECTIVES:

1. To study about the concept of Ancient Surgery in *Ayurveda* and literature of *Sushrut Samhita* for understanding the fundamental concept of Ancient Surgery.
2. To clarify the practical utility of Ancient Surgery for the welfare of human beings in present era comparison with literature of *Ayurvedic Samhitas*.

MATERIALS & METHODS:

- *Sushrut Samhita* and its commentary in Hindi.
- Other *Ayurvedic Samhita*, modern literature and journals related to Ancient Surgery were analyzed for comprehensive understanding of concept of Ancient Surgery its historical review, types, need, benefits and uses.

REVIEW OF LITERATURE

Sushruta has described plastic surgery. In plastic surgery particular *Nasa-sandhan* (Rhinoplasty), *Karna-sandhan* (Auroplasty) and *Oshta-sandhan* (lipoplasty) are mentioned in *Ayurved*. *Sushruta* has described 15 methods of *Karna-sandhan* (Auroplasty) repairs of the several ear-lobes. The concept of practical training mentioned in *Yogya soothreeya adhyaya* is still relevant. Before entering in the field of practice, the training at internship serves the same purpose which was proposed by *Sushruta* years back. *Sushruta* was the first person to classify surgical procedures in three divisions.

- ***Purva karma* (pre-Operative procedures)**
- ***Pradhana karma* (Operative procedures)**
- ***Paschath karma* (post-Operative procedures)**

***Poorva Karma* (Preoperative procedures) :-** *Acharya Sushruta* has mentioned in detail about the materials to be collected before any surgical procedures, which includes instruments and other preparations. Preparation of the surgical trolley, positioning surgical instruments and supplementary items in a way which facilitates their access and use, according to the anticipated sequence of the operative procedure which is followed now a day can be considered as a modified form of *Sushruta Acharya's* concept.

Sterilization It is evident that *Acharya Sushruta* also followed the sterilization method for various surgical procedures such as *Thaila Paayana*, *Udaka Paayana* and *Kshara paayana* and in the context of *Bhinna vrana chikitsa Agni tapta salaka* is used. Autoclaving of the surgical instruments, clothing and bandaging is being done by the modern surgery. **Preparation of Rogi (Patient) Diet Restriction** Generally light food is advised before doing the procedures. But surgeries pertaining to *Moodha garbha* (abnormal position of foetus), *Udara* (abdominal enlargement), *Arshas* (piles), *Ashmari* (renal calculus), *Bhagandara* (Fistula in ano), *Mukha roga*

(Diseases of mouth) are done nil by mouth. **Management of Pain** Evidence of anaesthesia used during *Sushruta's* period are: The development of branch of anaesthesia has led to the better advancement of surgery now a days and depending on the type of surgery different anaesthetic drugs are used. **Consent**

Sushruta has mentioned the importance of taking consent in the context of *Ashmari chikitsa*. In condition where death is certain if surgery is not done, when there is doubt between life and death while performing the surgery, then the surgeon should take consent from the authorities. *Acharya* has also mentioned about the consent in the context of *Mudhagarbha chikitsa*.

2. Pradhana Karma (Operative procedures) *Aacharya Sushruta* has classified basic surgical procedures into eight types viz., **Chedana (excision), Bhedana (incision), Lekhana (scrapping), Vyadhana (puncturing), Eshana (probing), Aharana (extraction), Visravana (drainage) and Seevana (suturing).**

1. Chedana – (Excision) *Chedana* is indicated in diseases like *Bhagandara* (fistula-in-ano), *Granthi* (cyst), *Tilakalaka* (mole), *Arbuda* (tumour), *Adhimamsa* (muscular hypertrophy) etc., *Acharya* has also explained about types of *Chedana* in different places like *Tiryak* (oblique) *Chedana* in *Bhru*, *Ganda*, *Lalata* etc, *Chandra mandala* (circular) in *Pani* and *Pada*, *Ardha chandrakruthi* (semi circular) in *Guda* and *Medra*. Instruments like *Mandalagra*, *Karapatra*, *Vridhi patra*, *Nakha sastra*, *Mudrika*, *Utpala patra*, *Ardha dara*, *Kutarika* are used for *Chedana karma*.

2. Bhedana – (Incision) *Bhedana* is indicated in diseases like *Vidradhi* (abscesses except *Sannipataja*), *Granthi* (cyst), *Vruddhi* (scrotal enlargement), *Prameha pidaka* (diabetic carbuncles), *Sopha* (Inflammatory swelling), *Anusaayi* (abscess of the foot), *Nadi* (Sinus ulcers) etc. *Bhedana* is indicated in wound which has pus inside, wound without opening, wound which have bulged up, mend wound having sinuses inside. It is done by inserting the lancet/ scalpel in the direction of hair (Langer's line) till pus is seen, avoiding vital spots, veins, ligaments, joints, bone and arteries. The *Sastra* should be taken out at once and quickly. In large inflammation the incision should be made two or three *Angulas* apart. A Surgical incision should have adequate length and width, clear division done at proper time and there should not be any hollow space inside. Wherever there is collection of pus (multiple pus pockets) incisions should be done so that vitiating material does not remain inside. The multiple or counter incision are required where the pus is not properly drained in a single incision. Different types of incisions to remove the fistulous tract as *Langalaka* (T shaped), *Ardha langalaka* (L shaped), *Sarvatobhadra* (Circular), *Gothirthaka* (Half moon), *Kharjura patra* (Serrated) are described for adoption according to the type of fistula.

3. Lekhana – (Scrapping) *Lekhana* is indicated in diseases like *Upajihvika* (swelling on the tongue), *Granthi* (cyst), *Adhijihvika* (adenoids) *Arshas* (haemorrhoids), *Mandala* (patches on skin) and *Mamsonnathi* (hypertrophied muscle). In wounds which are hard, having thick and round margin, which are burst open with hard and elevated muscles should be scraped. *Lekhana* should be even and uniform, done without leaving remnants, should have the thickness of eyelid, should be done using a sharp instrument. Modern surgery

makes use of *Lekhana karma* in dilatation and curettage. Instruments used for *Lekhana karma* are *Mandalagra*, *Karapatra* and *Nakha sasthanra*.

4. Vyadhana – (Puncturing) *Vyadhana* is indicated in disorders like *Bahuvridha sira* (different types of blood vessels), *Mootra vridhhi* (hydrocele) *Dakodaram* (ascites). Instruments like *Utpala patra*, *Vrihimukha*, *Ara sastra*, *Vetasapatra* are used for *Vyadhana karma*. *Karna vyadhana* (ear puncture) Piercing of the ear lobe of children using *Soochi* and *Aara sasthanra* and measures to manage the complications of improper *Vyadhana* were also explained.

5. Esana – (Probe) *Esana* is indicated in disorders like sinuses and wounds, with oblique course and foreign body. The word *Esana* means to be searched by introducing probe inside in order to find out the depth of the sinus and internal opening in case of fistula. *Esani sastra* is used for *Eshana karma*. Sinuses, wound with foreign body, those extending in wrong track and having pockets should be probed with soft stalks, hair and finger or probe. Sinuses in the vicinity of eyelid and rectus and those without opening and bleeding should be probed with stalks of *Chuchu* and *Upodaka*.

6. Aaharana – (Extraction) *Aaharana* is indicated in diseases like *Ashmari* (renal calculi), *Danta mala* (tartar of teeth), *Karna mala* (ear wax), *Moodha garbha* (obstructed labour), *Varchasa nichitham gude* (faeces accumulated in rectum). Instruments used for *Aaharana* are *Badisa* and *Danta sankhu*. Urinary stones and varieties, anatomy of urinary bladder, method of extraction by perineal lithotomy, operative complication, post operative wound management are explained in the context of *Asmari chikitsa*.

7. Visravana – (Drainage) *Visravana* is indicated in disorders like *Kushta* (skin diseases), *Ekadeshaja sophra* (localised inflammatory swelling), *Palyamaya* (diseases of ear pinnae), *Sleepada* (elephantiasis), *Visha jushta shonita* (poisoned blood), *Arbuda* (tumours), *Upadamsa* (erysipelas), *Granthi* (cyst) etc. Instruments used for *Visravana Karma* are *Soochi*, *Kusapathra*, *Aateemukha*, *Sararimukha*, *Antharmukha* and *Trikurchika*.

8. Seevana – (Suturing) *Seevana* is indicated in disorders caused by *Medas*, incised wounds and well scraped lesions, fresh wounds, those situated in the moving joints, wounds which are not suppurating, localised in the muscle and having wide opening. *Seevana* is contra indicated in wounds affected with caustics, cauterization or poison, gas gangrene, having blood or foreign body inside the wound. ***Seevana Dravyas*** The materials used for *Seevana* are explained in *Sushruta Samhita* in detail. The suturing materials explained in *Sushruta Samhita* highly resemble the one which are used in the modern surgery. This shows the knowledge of *Sushruta* on suturing material at that era.

Sutra (Thread) Different materials used for the preparation of *sutra* are *Asmanthala valkala* (fine fibre of *Asmanthaka* bark- *Bauhinia racemosa*) *Shana* (thread of *Sana* - *Corchorus capsularis*), *Kshouma* (silk thread), *Snayu* (ligament), *Bala* (hair) *Murva* (fibers of *Murva* -*Marsdenia tenacissima*), *Guduchi* (*Tinospora caudifolia*), In *Chidrodara*, anastomosis of intestine was done by clinching the head of black ants is the best example to show the usage of biological substance as absorbable sutures.

Soochi (Needles) Depending on the site, different types of *Soochi* (needles) are used, like circular type is used in places of *Alpa mamsa* and *Sandhi*, triangular shape in *Bahu mamsa*, semi circular in *Marma*, *Phalakosa*

and *Udara*. **Types of Seevana (Suturing)** Different types of suturing like *Vellitaka* (continuous suture), *Gophanika* (blanket suture), *Thunnasevini* (subcuticular), *Riju granthi* (interrupted) are mentioned in *Sushruta Samhita*.

3. Paschat Karma (Post-Operative) Acharya Sushruta has given an extensive knowledge about post – operative care. He has mentioned that the patient should be sprinkled with cold water; wound should be pressed all around with finger, gently massaged and washed with *Kashaya*. Then watery discharges wiped with sterile cotton swab and medicated wick should be inserted or covered with *Kalka*. Then it should be dressed with thick pad of gauze, fumigated with analgesic and disinfectant drugs. Then the patient should be admitted to ward and instructions regarding conduct should be given. ***Nasa sandhana (rhinoplasty)*** and other reconstructive surgeries were first mentioned by *Sushruta* in his text. A green leaf of a tree was taken and trimmed it as the shape and dimension of defect of nose. The cut leaf was used to raise the flap of same size and dimensions from the side of the cheek. Free end of the flap was turned towards the nose and apposed on the defect. Two tubes were inserted under the flap to keep the nostrils open. This is considered as a remarkable mile stone in the field of plastic surgery. ***Karna Sandhana (Lobuloplasty)*** has advised to perform the reconstructive surgeries of ear lobules in various defects either due to congenital or traumatic reasons. ***Oshta Sandhana (Repair of Lip)*** Description of repair of deformed lip is given in the same context of *Nasa sandhana*. Procedure is similar to that of *Nasa sandhana*, except the insertion of *Nadi dwaya*. **Abdominal Surgeries** *Baddha gudodara* (intestinal obstruction), *Chidrodera* (perforated intestine), *Dakodara* (Ascitis), Accidental injuries to *Asaya* (abdomen) in which protrusion of omentum and its treatment were described. General surgeries like *Vridhhi* (inguinal hernia), *Niruddha prakasa* (phimosis) were also described in *Sushruta Samhita*. **Gynecological and Obstetrical Surgeries** Surgical procedures like Extraction of *Muda garbha* (foetal obstruction), Caesarian section to save baby's life in *Mrutagarbha aharana* and management of *Sthana vidradhi* (breast abscess) were established by *Acharya Sushruta*. **Orthopaedic surgeries** *Acharya Sushruta* has given good description about bones, its fracture and dislocation. *Acharya Sushruta* has classified *Sandhi muktha* (dislocation of joints) into six types and *kandabhagna*³⁰ (fractures) into twelve types and treatment of *Avrana bhagna* (closed fracture), *Savrana bhagna* (open fracture), *Sira kapala bhagna* (fracture of skull) are well explained. Management viz. *Anchana* (traction), *Pidana* (compression), *Samksepa* (immobilization) and *bandana* (bandaging) are mentioned. This classification and description by *Sushruta* is being followed even at present. **Anorectal Surgeries** for *Arsas* (haemorrhoids), *Bhagandara* (fistula-in-ano), *Parikartika* (fissure in ano) are explained by *Acharya Sushruta* in *Sushruta samhita*. **Para-Surgical Procedures** *Agni karma* (Thermal cautery), *Kshara Karma* (Alkali) *Raktha Mokshana* (Blood letting) which are now considered as para-surgical techniques has described exclusively by *Acharya Sushruta*. Various instruments (*Dahana upakarana*)³¹ were used for *Agni karma* depending on the site of application for various disorders mainly involving musculo skeletal system. Use of *Kshara* in therapeutics for different ailments such as *Vrana*, *Arshas*, *Bhagandara* and *Raktha mokshana* procedures like *Sira Vyadha*, *Prachana* and with *Jaluka*, *Sringa*

and *Alabu* are explained in detail by Acharya *Sushruta*. **Surgical instruments** Acharya Sushruta has described 101 types of *Yantras* 32 (blunt instruments) and 20 types of *Shastras* (sharp instruments). The unique classification of surgical instruments as *Yantras* and *Shastras* holds good even today. He had also considered the importance of hand as the *Pradhana yantra* (most important) because without it, no operation can be performed. **Concept of *Vrana* (Ulcer)** Acharya *Sushruta* being a surgeon has given great importance to *Vrana* and its *Chikitsa* because for a surgeon knowledge of *Vrana* is very much essential. The *Vrana* or injury involves breakdown of body components and may have one or more of the following seats for occurrence, viz., skin (*Twak*), flesh (*Mamsa*), blood-vessels (*Sira*), ligaments (*Snayu*), bones (*Asthi*) and joints (*Sandhi*), internal organs (*Koshta*) and vital structures (*Marma*). Acharya *Sushruta* has described six varieties of *Sadyo Vrana* (Traumatic Wounds) viz., (i) *Chinna* (excised), (ii) *Bhinna* (incised), (iii) *Viddha* (punctured), (iv) *Ksata* (lacerated), (v) *Picchita* (crushed) and (vi) *Ghrista* (abrasion) encompassing almost all parts of the body and their probable causative agent or weapons. Acharya has also classified *Vrana* into *Suddha vrana* (clean wound) and *Dushta vrana* (non healing wound) and sixty different types of management. Acharya Sushruta has also elaborately explained about *Dagdha vranas* (burns) and classified it into *Plusta Dagdha* (singeing), *Durdagdha* (blister formation), *Samyak Dagdha* (therapeutic) and *Atidagdha* (severe or deep). Sushruta has also explained the management of *Dagdha vrana* in detail.

Contributions of **Acharya Sushruta** towards the practice of Ancient surgery include

- The use of cheek flaps to reconstruct absent ear lobes.
- The use of wine as anaesthesia
- Use of leeches to keep wounds free of blood clots.
- He taught that in order to be a good doctor, one should possess medical knowledge in both its theoretical and practical forms.
- He devised various experimental modules for his students to practice the different surgical procedures contained in his medical text. For instance, ‘incision’ and ‘excision’ were to be practiced on vegetables and leather bags filled with mud of different densities, ‘probing’ on moth-eaten wood or bamboo, and ‘puncturing’ on the veins of dead animals and lotus stalks.
- He compiled an encyclopedia of medical treatments. It contained detailed anatomical information and descriptions of much more surgical procedures, among them the first descriptions of Rhinoplasty and Otoplasty also.
- There was also a demand for ear reconstruction from adults and children whose heavy ear jewellery had split and infected their ear lobes. His discourse implies that this was a common problem, easily remedied by taking skin from the cheek and suturing it into the torn lobe.
- Before the amputation, skin could be trimmed from the leg or arm to fold back over the stump
- Cauterizing open wounds or amputated limbs with hot oil.

CONCLUSION

Many of the techniques used in recent era of reconstruction surgeries were mentioned by *Acharya Sushruta* in *Sushrut Samhita sutrasthan* in different reconstructions of ear, nose and lip. This extraordinary knowledge indicates the greatness of our *Acharyas*, and we have to do research on their treatment modalities. Many times, the skin graft if not accepted due to poor blood supply of the recipient area, at this time the leech therapy can be tried. *Sushruta* has clearly stated different forms of incisions should be taken on various body areas when it comes to skin incision and excision. If these criteria are not followed, there is a risk of wound non-healing or the creation of hard tissue (*Mamsakandi*), which is linked to Keloid. Incisions should be made in the direction of skin creases and without strain on the incision line to avoid a large and ugly scar, according to modern research. When these lines are compared to *Sushruta's* description of different incisions on various regions of the body, we can see that these incisions likewise follow the precise concept of Modern Sciences. The surgical procedures explained in *Sushruta Samhita* forms the basis for modern surgery. This principles of skin grafting followed by *Sushruta* holds good even today. Hence *Sushruta* is considered as father of surgery. The *Ashta vidha shastra karma* are being implemented in various forms in Modern Surgery even today. *Sushruta* has given clear instruction on surgical procedures but the references are scattered. The *Chikitsa of Asthi* and *Sandhi bhagna* was described by *Sushruta* under heading of *Bhagna*. The concept of physical rehabilitation after full recovery from the fracture and dislocation is followed by Orthopaedic surgeons and has now become a new branch known as physiotherapy. The knowledge of alleviating pain during surgery was started by *Sushruta*. The advancement in science and technology has led to the development of branch of anaesthesia. The shape of *Yantras* and *Sastras* are further modernized to compete with the surgery in the modern era. Even today the basic concept and functions of these remain the same. The students were required to practice surgical procedures on vegetables and fruits before attempting the same on live individuals in ancient days but now the same is practiced on dummies. Any injury at these places may end up in morbidity or mortality. The above features show that by establishing the co-ordination with allied sciences there would be a better scientific approach of Ayurvedic science.

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