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'Salyachikitsa': Origin and Development of Surgical Science in Ancient India – A Comprehensive Study from the Perspective of the Indian Knowledge System

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Abstract: Ayurveda is the key source of ancient Indian Medical System. There are eight branches of Ayurveda. Surgery, or *'Salyachikitsa'* was developed during the Vedic period. Many historians of modern era referred to Suśruta as the father of Indian Surgery. He was the pioneer of Plastic Surgery and cosmetic surgery. During his period, among all the eight limbs of Indian medical science or 'Ayurveda', *'Salya Chikitsa'* was given the top priority. He developed various surgical instruments. At that time, every medical student was required to conduct a dissection of a dead body, as practical surgery requires a good knowledge of anatomy. Dead bodies were preserved for this reason. Practical training was essential for every medical student who had wish to be a surgeon. The aim of NEP to integrate 'Ayurveda' into the mainstream education by blending traditional wisdom with modern science.

Keyword: Ayurveda, Salya chikitsa, Suśruta, Surgery, Surgeon

Introduction:

From the very beginning of the Indian civilization, Indian wisdom was enriched by the knowledge of medical sciences. The ancient Indian knowledge of medical science is called 'Ayurveda'. According to the Indian Mythology the origin of 'Ayurveda' was attributed to the lord Brahma, who is the supreme creator of the universe. It was believed that lord Brahma, before the creation of mankind, composed 'Ayurveda' or the science of life in 100000 slokas divided into 1000 chapters.[1] It was later revised and condensed into eight branches to suit shorter lives and lesser human intelligence. Eight divisions of 'Ayurveda' as under—

1. Kaya Chikitsa or General Medicine
2. Bala Chikitsa or Pediatrics
3. Graha Chikitsa or Demonology
4. Salya Chikitsa or Surgical treatment
5. Salakya Chikitsa or E.N.T & Ophthalmology
6. Visha Chikitsa or Toxicology
7. Rasayana or the Science of Rejuvenation
8. Vajeekarana or the Science of Aphrodisiacs

Through this article we are going to explore the ancient Indian Surgical treatment; its origin, development and impact on modern medical system.

Definition of Salya Chikitsa:

Any foreign matter, lodged in a human organism and provide pain is

called a Salya. Sushruta Samhita defines the aims and objectives of Salya Chikitsa. According to the Sushruta Samhita, 'the scope of this branch (Salya Chikitsa) of 'Ayurveda' is to remove from an ulcer any extraneous substance such as, fragments of hay, particular of stone, dust , iron or bone ; splinters, nails, hair, clotted blood, or to draw out the uterus a dead fetus or to bring about safe parturition in case of false presentation and to deal with principle and mode of using and handling surgical instruments in general and with the application of fire and alkaline substances together with the diagnosis and treatment of ulcers.' It was later revised and condensed into eight branches to suit shorter lives and lesser human intelligence. Eight divisions of 'Ayurveda' as under—

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Origin of Salya Chikitsa:

According to traditional beliefs, the Vedas are the supreme source of all Indian knowledge, and the Rigveda is considered the oldest among the four Vedas. In the Rigveda Ashvins, the surgeons of heaven, successfully performed many difficult surgical operations. In the Rigveda, we find that legs were amputated and replaced by iron substitutes,[3] and injured eyes were plucked out.[4] Ear plasty, or otoplasty, was done by Ashvins[5]. Ashvins conjoined the severed body parts of Syavasya and gave him life.[6]

We find various examples of surgery in the Atharva Veda. The Atharva Veda referred to the removal of the pregnancy by tearing the uterus and removing the stagnant urine from the bladder.

"वि ते भिनद्मि मेहनं वि योनिं वा गविनिके।
विमातरं च पुत्रं च वि कुमारं जरायुणाव जरायु पद्यताम्॥[7]"

The Atharva Veda describes a theory of disease related to urine and toxin elimination. It states that when urine is excreted with force, it removes numerous diseases by expelling accumulated bodily toxins. Conversely, if urine flow is obstructed, these toxins are thought to spread throughout the body. The Atharva Veda suggests that blocked urine should be medically addressed, specifically by draining the bladder using an inserted arrow.[8] Surgery is also used for the treatment of wounds caused by poison[9] and the healing of bone fractures.[10] Every surgeon must have perfect knowledge regarding the anatomical structures of the body. The 10th Kanda of the Atharva Veda contains a special hymn on the creation of '*purusha*' in which several parts of the skeleton have been described. They are heel, ankle bone, long bones, knee, leg bones, pelvic cavity, thigh, chest, neck bone, back bone, collar bone, brow, and jaws.[11]

Anatomical references and example of surgery are also find in Brahmana literature. According to the Satapatha Brahmana, the number of bones in a man is 360. The reference regarding the dissection of a dead body is also found in the Satapatha Brahmana.[12] The refereence to Plastic Surgery is found in the Jaiminiya Brahmana.[13]

The Ramayana and the Mahabharata are considered two great epics of ancient Indian Literature. In both the epics, surgical references have been found. Reference regarding transplantation of organs is found in a story of the Ramayana, where the sage Gautama castrated once the testicles of lord Indra. In place of that, Ashvins, the divine physician, transplanted the testicles of a goat. Amputation was known to the people in the era of the Ramayana. In the Sundara Khanda of the Ramayana, Sita sent a message through Hanuman to Rama, conveying her misery. She said, 'If Rama does not come soon, Ravana will amputate my body with sharp instruments like the surgeon who amputates the parts of a baby situated in the womb and throws it out of the womb.[14]' The knowledge regarding the preservation of the dead body and examination of the dead or alive was well developed in the era of the Ramayana. The Mahabharata provides various examples of surgery. Maharaja Yudhisthira appointed surgeon to protect their army[15]. In the battlefield of the Kurukshetra, Bhishma was wounded and was lying on the bed of arrows. Duryodhana called experienced and skilled surgeons to treat Bhisma[16]. This incident proclaims that, in the era of the Mahabharata, the surgeons had much knowledge to extract arrow from the limbs of the warriors.

Development of Salya Chikitsa:

The era of Suśruta may be called the golden age of 'Ayurveda'. Many historians of the modern era referred to Suśruta as the father of Indian Surgery. He was the pioneer of Plastic Surgery and cosmetic surgery. During his period, among all the eight limbs of Indian medical science or 'Ayurveda' *'Salya Chikitsa'* was given the top priority. Suśruta belongs to

the School of Dhanvantari. The ward 'Dhanvantari' refers to the master of Surgery. At that time, those who learned '*Salya Chikitsa'* are called 'Dhanvantari'.[17] Apart from Suśruta, Aupadhenava Aurabhra, and Paushkalavata were known as surgeons during his era. According to Dalhana's commentary, it is known to all that Aupadhenava, Aurabhra, Paushkalavata, Vaitarana, Karavirya, and Gopura Rakshita were the colleagues of Suśruta, and they belong to the school of Dhanvantari. In 'Suśruta Samhita', Suśruta referred to their name. It is known from 'Chikitsakalika' that Aupadhenava and Aurabhra were famous in the art of surgery.[18] Aupadhenava composed a text on 'Salya chikitsa' named 'Aupadenava Tantra. Aurabhara also composed a text on the same subject, named 'Aurabhara Tantra'. Unfortunately, these books are not available now. 'Bhoja Tantra' was composed by Bhoja. He was also the contemporary surgeon of Suśruta. The commentators of Suśruta and others, in their works, quoted several references about the 'Bhoja Tantra'. Vaitarana composed a book named 'Vaitarana Tantra'. He was a specialist in surgery. Dalhana also quoted the concept of 'Vaitarana' while discussing the treatment of '*Ashmari*'. It was said that surgical techniques that were not mentioned in 'Suśruta Samhita' were found in 'Vaitarana Tantra'. It was certainly proclaimed that the importance of the 'Vaitarana Tantra'. But almost all the other works on 'Salya chikitsa', composed by the contemporary author or surgeon of Suśruta, are lost to us. Dalhan, as well as Chakrapanidutta, mentioned the name of 'Bhaluki Tantra', which is also related to *'Salya Chikitsa'.* List of surgical instruments found in 'Harita Samhita'. From the 'Bhojaprabandha', it was revealed that, at that time, before surgery, some kind of anesthesia was performed by inhalation. Vāgbhaṭa mentioned various kinds of surgery in his 'Aṣṭānga Hridayam' and 'Aṣṭānga Sangraha'. Jivaka was the eminent physician of Buddha's time in the 6th century B.C. From the Mahāvāgga, we learn that he practiced cranial surgery with success[19].

'Suśruta Samhita' and the role of Suśruta:

The 'Suśruta Samhita' is the only complete work of ancient India that deals with the problems of practical surgery and midwifery. In the *'SuśrutaSamhita'*, surgical procedures are systematically detailed across three phases: pre-operative, operative, and post-operative measures. Suśruta first classified all surgical operations into various kinds and grouped them as–

1.Aharya (extractions of solid bodies)
2.Bhedya (excising)
3.Chhedya (incising)
4.Eshya (probing)
5.Lekhya (Scarifying)
6.Sivya (Suturing)
7.Vedhya (Puncturing)
8.Visravaniya (evacuating fluids)

According to Suśruta, a Surgeon, preparing for any operation must first

obtain surgical equipment and instruments. He enumerated an extensive and carefully chosen set of instruments and accessories indispensable for the procedure: 1.alkali, 2.fire, 3. *Ś*alākā or rod,3.horns, 4.leeches, 5.gourd, 6.*Jamvavoushta* (a specialized surgical pencil), 7.cotton, 8.lint, 9.thread, 10.leaves,11. tow, 12.honey, 13.clarified butter, 14.lard, 15.milk, 16.oil, 17.medicated plaster, and 18. *Tarpanam* (powdered wheat infused in water), along with essential utilities such as a fan, and both cold and hot water.[20] Yet, beyond these tangible tools, the presence of disciplined, devoted, and steady-nerved attendants was considered equally vital, ensuring that the operation proceeded with precision, confidence, and absolute control.

Suśruta emphasized that a surgeon must possess specific qualities at the time of operation to ensure success and safety. Foremost among these is courage—the strength to undertake difficult procedures without hesitation. The surgeon's hands must be light, steady, and precise, enabling skillful handling of sharp instruments. Equally important is complete control over the body, free from trembling or perspiration, allowing unwavering concentration throughout the procedure. Expertise in the use of surgical tools is essential, ensuring efficiency and accuracy in every action. Above all, the surgeon must demonstrate firm self-confidence and disciplined self-command, empowering them to make swift, sound decisions and maintain control of the surgical setting at all times.

Before the operation, the patient should be given light food. But in the disease of piles operation, in stone in bladder, in fistula, and in diseases affecting the cavity of the mouth, the patient should be kept on an empty stomach. During the operation, the patient should sit with his face turned towards the east. The Surgeon should carefully avoid the vital parts of the patients, like veins, nerves, joints, bones, and arteries, and sit with his face towards the west. Then he should insert the knife into the affected part along the proper direction till the suppurated part would be reached and swiftly draw it out. The sprays of cold water should be dashed over the face and the eyes of the patient to relieve the pain and sense of exhaustion incidental to the operation.

Method of Surgery Learning according to the 'Suśruta Samhita':

During the period of Suśruta, it was strongly believed that the physicians must be well versed in both the aspects of theoretical and practical aspects regarding surgery. In 'Suśruta Samhita', it is mentioned that those who have only knowledge either in theory or in practice are not eligible for the medical profession[21] In this era, every medical student is required to conduct a dissection of a dead body, as practical surgery requires a good knowledge of anatomy. Dead bodies were preserved for this reason. Practical training was essential for every medical student who had wish to be a surgeon. There was a rule for medical students that the surgical techniques should be practiced on flowers and fruits during the course of learning operative surgery. For that reason, excisions were practiced on fruits and vegetables, like *Alabu* (Bottle Gourd), incisions were practiced on bladders and

internal organs of dead animals, leather bags, etc. Scrapings were practiced on animal skin covered with hair. Venesection was practiced on recently dead animals or stalks of water lily. Extraction was practiced on the pulp of *Bilwa*. Suturing was practiced on thick cloth or leather. Bandaging was practiced on full sized human figures of clay.[22] According to the 'Suśruta Samhita', prior to performing 'Vasti Karma' learner physician should have practiced with a similar type of '*Vastiyantra*' made of leather. It was also said that he should practice the cauterization technique on dead animals.

Surgical Instruments of ancient India according to the 'Suśruta Samhita':

The medical armamentarium of the ancient Indian surgeons consisted of a god number of Surgical instruments. They are described to be of two kinds: the *Yantras* or blunt and the *śastras* or sharp instruments. These instruments are advised to be made generally of iron or of other suitable materials when iron is not available. They should be of strong make, good shape, and capable of a firm grasp. They look like the shape of beasts and birds.[23] Suśruta enumerates no less than one hundred and one varieties of blunt instruments and twenty different kinds of sharp instruments. Hārīta, on the other hand, enumerates twelve blunt instruments, twelve sharp instruments, and four prabandhas as necessary for the operation of arrows and other foreign bodies. Vāgbhaṭa II mentions one hundred and fifteen kinds of blunt and twenty-six kinds of sharp instruments. Suśruta subdivides the blunt instruments into six classes as-

1.Svastika or Cruciform instruments -24 kinds
2.Sandaṁśa or Pincher – 2 kinds
3.Tala or Picklock – 2 kinds
4.Nadi or tubular of hollow- 20 kinds
5.Śalākā or rod- 28 kinds
6.Upayantra or accessory - 25 kinds
7.Total 101 kinds

Details description of in instruments is as follows-

A.The Svastika or Cruciform instruments are 1. Simhamukha. 2. Vyaghramukha. 3. Vrkarnukha. 4. Taraksu-mukha. 5. Rksamukha. 6. Dvipimukha. 7. Marjaramukha. 8. Srgala-mukha. 9. Airvvarukamukha. 10. Kakamukha. 1. Kankamukha. 12. Kuraramukha. 13. Casamukha. 14. Bhasamukha. 15. Sasaghati-mukha. 16. Ulükamukha. 19. Syenamukha. 17. Cillimukha. 20 Krauücamukha. 18. Grdhramukha. 21. Bhrügarajamukha. 22. Aiijalikarnamukha. 23 Avabhaiijanamukha, and 24. Nandimukhamukha.

B. **The Sandaṁśa or pincher-like instruments**— 1. Forceps with arms. 2. Forceps without arms.

C. **The Tala or picklock-like instruments are**— 1. Ekatala. 2. Dwitala.

D. **Nadi or tubular instruments are -**1. For Fistula-in-ano (2 kinds), 2. For Piles (2 Kinds), 3. For Wound (1 kind), 4. For Clysters [Rectal] (4

Kinds), 5. For Clysters [Vaginal and urethral] (3 Kinds), 6. For Hydrocele (1 kind), 7. For Ascites (1 kind) 8. For Fumigation and inhalation (3 kinds) 9. Urethral Stricture (1 kind), 10. For Rectal (1 kind) 11. For Cupping-gourd (1kind)

E. **The Śalākā or rod-shaped instruments** are—1. Gandüpadamukha or earthworm-like (2 kinds) 2. Sarapunkhamukha or arowl-stem like (2kinds), 3. Sarpafanamukha or snake's hood-like (2 kinds) 4. Vadisamukha or fish-hook like (2 kinds) 5. Masüradalamukha or masüra pulse like (2 kinds) 6. Promarjana or swabs (6 kinds) 7. Khailamukha or spoons (3 kinds) 8. Jamvavavadana or jambul seed like (3 kinds) 9. AnkuSavadana or goad-like (3 kinds) 10. Kolastinidalamukha or plumseed like (1 kind) 11. Mukulagra or bud-shaped (1 kind) 12. Malatipuspavrntagra, or like the stem of the malati flower (1 kind)

VI. **The Upayantra or accessory instruments** are— 1. Rajju—thread. 2. Venika—twine. 3. Patta—bandages. 4. Carma—leather. 5. Valkala—bark of trees. 6, Lats—creepers. 8. Asthilasma—stone or pebble, 9. Mud-gara— hammer. 10. 7. Vastra—cloth. Panipadatala—palm of the hand, sole of the foot. Il. Anguli—finger. 12. Jihvá—tongue. 13. Danta—tooth. 14. Nakha— nail. 15. Mukha—mouth. 16. Vala—hair. 17. Asvakataka—the ring of a horse's bridle. 18. Sakha—a branch of a tree. 19. Sthivana—spíttle. 20. Pravahana—flushing the patient. 21. Harsa—objects exiting happiness. 22. Ayaskanta—a loadstone. 23. Ksára—caustic. 24. Agni—fire. 25. Bhesaja—medicines[24].

B. The sharp instruments or Śastras are— 1. Mandalagra or round-headed knife. 2. Karapatra or saw (lit like the human hand). 3. Vrddhipatra (like the leaf of vrddhi—an unknown medicinal plant)—a razor. 4. Nakha-Sastra or nail-parer. 5. Mudrika or finger-knife (like the last phalanx of the index finger). 6. Utpalapatra, a knife, i.e., resembling the petal of blue lotus (Nymphaea stellata, Willd). 7. Arddhadhara or a single-edged knife. 8. Süci— needles. 9. Kusapatra—a knife shaped like the kusa grass 10. Atimukha—a knife shaped like the beak of the Ati bird. 11. Sarari -mukha—a "pair of scissors like the breaks of the Sarari bird. 12. Antarmu-kha (having an internal sharp edge)—a kind of scissors. 13. Trikurccaka—an instrument consisting of three needles. 14. Kutharika—a small axe-shaped instrument. 15. Vrihmukha—a trocar shaped like a grain of rice. 16. Ara or awl. 17. Vetasa-partraka—an instrument shaped like the leaf of a rattan (Calamus Rotang). 18. Vadisa—an instrument shaped like a fishhook 19. Dantaśanku or tooth pick 20. Eṣani or sharp probe-like instruments.[25]

Svastika or Cruciform instruments are used for the extraction of foreign bodies impacted in the bones. The first variety of Sandaṁśa instruments are likened to forceps with arms, used by the barbers for depilating the nasal cavities, while the second variety is like the armless forceps used by the goldsmiths. Tala instruments are intended for the purpose of extracting for-eign bodies from the ear, nose, and other outer canals of the body. The tub-ular instruments are used for fistula-in-ano, hemorrhoids, tumors, abscesses,

injections into the rectum, vagina and urethra, hydroceles, ascites, inhalations, stricture of the urethra and rectum and cupping as by gourd and horns.[26]

Impact of ancient '*Salya Chikitsa'* on the modern medical system:

The modern medical system unknowingly follows the ancient Indian medical tradition. If we go through our ancient surgery texts, it will certainly probe that knowledge of the Indian medical system still has more impact on the modern medical system. Hippocrates belonged to Greece and was known as 'the Father of Medicine.' He wrote Materia Medica, where many number of Indian Drugs were found. His works also give a lot of information regarding the principles of Ayurveda, information regarding various Indian drugs, pathogenesis, mode of administration of drugs, and qualities of the attendants and their service rendered to the patient. The striking similarity in many points between the Greek and Indian medical systems are as similarities in the science of embryology, production of twins, removal of dead fetus by surgery, and many surgical instruments. Through such kinds of examples, Dr. J.J. Modi proved that all the systems of medicine in the world originated from the Ayurveda[27].

Conclusion:

Ancient Indian knowledge regarding surgery was outstanding and glorious. Various types of surgery, their procedure, various kinds of instruments certainly probe that the science of the art of surgery was successfully practiced in ancient India. But the art of Surgery began to decline during the Buddhist era, and all vestiges of this '*Salya Chikitsa'* or Surgery became lost during the foreign rule. But after the independence Government of India takes various measures to glorify the ancient Indian meditational heritage. Several Ayurvedic research center was set up throughout the country. The AYUSH department was set up. Recently, in the National Education Policy, Ayurveda has regained its lost glory. The aim of NEP is to integrate 'Ayurveda' into mainstream education by blending traditional wisdom with modern science. Through recent education policies, school students, college students will be able to know the glorious heritage of the ancient Indian medical System.

Endnotes

1. A Hand Book of History of Ayurveda, pg 78
2. Suśruta Samhita 1/6
3. Rigveda 1/116/15
4. Ibid 1/117/17
5. Ibid 1/117/8
6. Ibid 10/39/3
7. Atharva Veda 1/11/5
8. Ibid 1/3/6/9
9. Ibid 4/6/5
10. Ibid 4/12/2
11. A Hand Book of History of Ayurveda pg 16
12. Satapatha Brahmana 1/8/3/18

13. Jaiminiya Brahmana ch 36
14. Ramayana, Sundara khanda
15. Mahabharata uddyoga parva 10/12
16. Ibid Bhisma Parva 20/55/59
17. A Hand Book of History of Ayurveda pg 106
18. Ibid pg 109
19. Mahāvāgga. Viii. 1.18
20. Suśruta Samhita chapter 5
21. A Hand Book of History of Ayurveda pg 107
22. Ibid pg 130
23. Suśruta Samhita chapter 7
24. Surgical Instruments of Ancient Hindus pg-64-66
25. Ibid pg 66-67
26. Ibid pg 74-85
27. A Hand Book of History of Ayurveda, pg 249

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