

# The Pioneer of Plastic Surgery – ‘Sushruta’

AJAY K. GUPTA

## Abstract

*Sushruta*, one of the earliest surgeon of the recorded history (600 B.C.) is believed to be the first person to describe plastic surgery. *Sushruta*, who lived nearly 150 years before Hippocrates, has vividly described the basic principles of plastic surgery in his famous ancient treatise ‘*Sushruta samhita*’. *Sushruta samhita* is the oldest authentic text-book of *Shalya-tantra* describing the Re-constructive plastic surgical operations. Numerous re-constructive surgical techniques and some exclusive cosmetic procedures have been narrated besides other surgical maneuvers by *Sushruta*. This paper presents a historical window into various contributions of *Sushruta* towards plastic surgery and allied fields described in ‘*Sushruta samhita*’ around 1000 B.C.

*Key Words* : Sushruta, Sushruta samhita, Rhinoplasty and Plastic surgery

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Since antiquity, probably man had a desire for looking good. This may be one of the possible reason that led to invention of plastic surgery. Although many people consider Plastic surgery as a relatively new specialty, the origin of plastic surgery had its roots more than 4000 years old in India, back to the Indus River Civilization (Agarwal, nd). The Mythico-religious *shlokas* (hymns) associated with this civilization were compiled in Sanskrit language between 3000 and 1000 B.C. in the form of Vedas, the oldest sacred books of Hindu religion (Raju, 2003). This era is referred to as the Vedic period (5000 B.C.) in ancient history during which the four Vedas, namely the Rigveda, the Samveda, the Yajurveda, and the Atharvaveda, were compiled. All the four Vedas are in the form of *Shlokas* (hymns), verses, incantations and rites in Sanskrit language. In fact ‘*Sushrutasmhita*’ is a part of Ayurveda, which is an *Upaveda* of *Atharvaveda*.

‘*Sushruta samhita*’ (Sushruta’s compendium), which describes the ancient tradition of surgery in Indian medicine is considered as one of the most brilliant gems in Indian medical literature. This treatise contains detailed descriptions of teachings and practice of the great ancient surgeon *Sushruta*, and has

considerable surgical knowledge of relevance even today.

## Review of Literature

‘*Sushruta samhita*’ contains the major surgical text of Vedas and is considered to be the most advanced compilation of surgical practices of its time. ‘*Sushruta samhita*’ comprises not only the teachings regarding plastic surgery, but also contains composite teachings of the surgery and all the allied branches including midwifery and thus making it a comprehensive treatise of the entire medical discipline. *Sushruta* believed that knowledge of both surgery and medicine are essential to constitute a good doctor who otherwise is “like a bird with only one wing”. In fact, *Sushruta* emphasized in his text that unless one possesses enough knowledge of relevant sister branches of learning, he cannot attain proficiency in his own subject of study.

According to *Sushruta*, “Anyone, who wishes to acquire a thorough knowledge of anatomy, must prepare a dead body and carefully observe and examine all its parts”. The method of study was to submerge the body in water and allow it to decompose followed by examination of the decomposing body at intervals to study

structures, layer by layer, as they got exposed following decomposition. The most important point to note here is that dissection was performed without using a knife (SushrutaSamhitaSha.5/61).

The followers of Sushruta were called as Sushruta's. The new student was expected to study for several years. Before starting his training he had to take a solemn oath, which can be compared to that of Hippocrates' oath. He taught the surgical skills to his students on various experimental modules, viz. *Yogya* (i.e. practices on raw vegetables, plants, worm eaten wood, etc), preceding present day workshops by more than 1000 B.C.

This master literature remained preserved for many centuries exclusively in Sanskrit language which prevented the dissemination of knowledge to the west and other parts of the world. Later the original text was lost and the present extant one is believed to be a revision by the Buddhist scholar Vasubandhu (circa AD 360 – 350). In the eighth century A.D., *Sushrutasamhita* was translated into Arabic as '*Kitab-Shaw Shoon-a-Hindi*' and '*Kitab-i-Susrud*' (Mukhopadhyaya, 1929, p.17).

The translation of *Sushruta samhita* was ordered by Caliph Mansur (A.D. 753-774). One of the most important documents in connection with ancient Indian medicine is the Bower Manuscript, a birch-bark medical treatise discovered in Kuchar (in Eastern Turkistan), dated around A.D. 450, and is housed in the Oxford University library (Raju, 2003; Hoernle, 1907, p. 109; Wise, 1845, p.1). The first European translation of *Sushruta samhita* was published by Hessler in Latin and into German by Muller in the early nineteenth century (Mukhopadhyaya, 1929, p.17). The first complete English translation was done by Kaviraj Kunja Lal Bhishagratna in three volumes in 1910 in Calcutta with a later edition in 1963 (Chari, 2003; Das, 2007).

All the basic principles of plastic surgery like planning, precision, haemostasis and

perfection find an important place in *Sushruta's* writings on this subject. *Sushruta* described various Reconstructive methods on different types of defects, eg. Release of skin for covering small defects, rotation of the flaps to make up for the partial loss and pedicle flaps for covering complete loss of skin from an area. One of the great highlight of *Sushruta's* re-constructive surgery was the operation of Rhinoplasty. This making of a *new nose* captured the imagination of the medical world and brought him fame as the originator of plastic surgery (Bhishagratna, 1963). The famous Indian Rhinoplasty (reproduced in the October 1794 issue of the Gentleman's Magazine of London) is a modification of the ancient Rhinoplasty described by *Sushruta* in 600 B.C. (Castiglioni, 1943, p.85). Even today Pedicle forehead flap is referred to as "Indian Flap" (Vyas, 2012).

Ackernecht has aptly observed – "There is little doubt that plastic surgery in Europe which flourished in medieval Italy is a direct descendant of classical Indian surgery" (Ackernecht, 1982, p.41).

### Rhinoplasty

Rhinoplasty (*Nasika-Sandhan*) has vividly been described by *Sushruta* and stated as – "The portion of nose to be reconstructed should be first measured with a suitable green leaf. Then a piece of measured skin of the required size should be dissected from the living skin of the adjoining cheek and turned back to cover the nose, keeping a small pedicle attached to the cheek. The part of the nose to which the skin flap is to be attached should be made raw with the help of a knife. Then the surgeon should place the dissected skin flap on the desired site of nose and suture the two parts quickly, keeping the skin properly elevated by inserting two tubes of the Eranda (castor oil plant) in the position of the nostrils, so that the new nose gets proper shape. The skin thus properly adjusted, should then be sprinkled with fine powder of

*Rakta-chandan* (*Pterocarpus santalinus*), *Yashti-madhu* (*Glycyrrhiza glabra*) and *Rasonta* (*Barberis aristata*). Finally, it should be covered with cotton followed by an application of *Sesamum* oil (*Sesamum indicum*) constantly. When the skin flap has united and granulated, its adjoining part with the cheek is cut and separated. If the reformed nose is too short or too long, an endeavor is made to enlarge or shorten it, and hypertrophied tissue is excised so as to give proper shape to the reconstructed nose” (SusrutaSamhitaSu.16/49-53).

Speculations have been raised as how, in the absence of Anesthetics, the Indian surgeons carried out such major operations. *Sushruta* states that “*Madya*”(wine) should be used before operation to produce insensibility to pain. He again remarks: “The patient who has been fed, does not faint, and he who is rendered intoxicated, does not feel the pain of the operation” (SusrutaSamhitaSu.17/16-17).

*Sushruta* considered surgery as the first and foremost branch of medical science and stated: “Surgery has the superior advantage of producing instantaneous effects by means of surgical instruments and appliances. Hence, it is the highest in value of all the medical tantras. It is

eternal and a source of infinite piety, imparts fame and opens the gates of Heaven to its votaries. It prolongs the duration of human existence on Earth and helps men in successfully fulfilling their missions and earning a decent competence in life”(SusrutaSamhitaSu.1/26-27). *Sushruta* warns that improper intervention with surgical maneuver either due to ignorance of the progress of the disease-process, greedy for money or lack of judgment, lead only to complications. *Sushruta*'s general advice to physicians would certainly apply to doctors in any age and anywhere in the world: “A surgeon who has set out on his path should have witnessed operations. He must be licensed by the king. He should be clean and keep his nails & hair short. He should be cheerful, well spoken and honest” (SusrutaSamhitaSu. 10/3).

The genius of *Sushruta* prompted eminent surgeon Whipple (1963) to declare – “All in all, *Sushruta* must be considered the greatest surgeon of the premedieval period” (Whipple, p.18; Raju, 2003). Rhazes repeatedly quoted *Sushruta* as the foremost authority in surgery (Mukhopadhyaya, 1929, p.17).

*Sushruta*'s contribution in the field of plastic surgery can be enumerated as follows:

Major Contributions	References
<i>Nasika-sandhan</i> (Rhinoplasty)	SusrutaSamhitaSu.16/49-53
<i>Karna-sandhan</i> (Lobuloplasty/ Ear repair techniques)	SusrutaSamhitaSu.16/16
<i>Oshtha-sandhan</i> (Repair of accidental lip injuries and congenital Cleft-lip)	SusrutaSamhitaSu.16/54
Piercing children's ear with a needle	SusrutaSamhitaSu.16/3
Classification of burns into four degrees and explaining the effect of heat stroke, frost bite and lightening injuries	SusrutaSamhitaSu.12/16,37,38
Use of suture materials of bark, hair or silk	SusrutaSamhitaSu.25/20-22
Use of various types of needles	SusrutaSamhitaSu.25/23-25
Fourteen types of bandaging capable of covering almost all regions of the body, and different methods of dressings with various medicaments	SusrutaSamhitaSu.18/6, 18,19
Use of <i>Madya</i> (wine) to decrease the pain of surgical procedures	SusrutaSamhitaSu.17/16
Description of 20 varieties of <i>Shastras</i> (sharp instruments) and 101	SusrutaSamhitaSu.8,9 chap.

<i>Yantras</i> (blunt instruments) with their handling techniques	
Systematic dissection of Cadavers	SusrutaSamhitaSha.5/61
<i>Yogya</i> – practice of mock operations on inanimate objects	SusrutaSamhitaSu..9 chap.
Use of <i>Jalauka</i> to keep wounds free of blood clots	SusrutaSamhitaSu.13 chap.
A code of ethics for teachers as well as students, eg. Before initiating surgery, <i>Sushruta</i> has advised <i>to take permission from the king</i>	SusrutaSamhitaChi.7/29

*Sushruta's contribution to allied fields are :*

Major Contributions	References
Surgical demonstration of techniques of making incisions, probing, extraction of foreign bodies, alkali and thermal cauterization, tooth extraction, excisions, trocars for draining abscess, hydrocele and ascitic fluid	SusrutaSamhitaSu.11, 12, 25 chap.
Described removal of prostate gland, urethral stricture dilatation, vesiculolithotomy, hernia surgery, caesarian section, management of haemorrhoids, fistulae, laprotomy, management of intestinal obstruction, perforated intestine, accidental perforation of abdomen with protrusion of omentum	SusrutaSamhitaChi.2,6,7,8,14 chap.
Classified details of the six types of dislocations, twelve varieties of fractures, classification of bones and their reaction to the injuries	SusrutaSamhitaNi. 15 chap
Principles of fracture management, viz. traction, manipulation, opposition & stabilization, including some measures of rehabilitation and fitting of prosthesis	SusrutaSamhitaChi.3 chap
Description of procedure of suturing intestine by using Ant-heads as suturing material	SusrutaSamhitaChi.14/17
Dissection and study of anatomy of human body	SusrutaSamhitaSha.5/61
Enumeration of 1120 illnesses, and recommended diagnosis by inspection, palpation and auscultation	SusrutaSamhitaUtt.66/8, SusrutaSamhitaSu.10/4-5

## CONCLUSION

Sushruta took surgery in medieval India to admirable heights and that era was later regarded as “*The Golden Age of Surgery*” in ancient India. Because of his numerous seminal contributions to the science and art of surgery in India, he is regarded as the ‘*Father of Indian Surgery*’ and the ‘*Father of Plastic Surgery*’ (Raju, 2003; Tewari & Shukla, 2005; Rana & Arora, 2002)

In ‘The source book of plastic surgery’, Frank McDowell aptly described *Sushruta* as follows: “Through all of *Sushruta's* flowery language, incantations and irrelevancies, there shines the unmistakable picture of a great surgeon. Undaunted by his failures, unimpressed by his successes, he sought the truth unceasingly and

passed it on to those who followed. He attacked disease and deformity definitively, with reasoned and logical methods. When the path did not exist, he made one” (McDowell, 1977).

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AJAY K. GUPTA, B.A.M.S., M.S. (Ayu.), Associate Professor, Department of Shalya-Tantra, Rishikul Govt. P.G. Ayurvedic College & Hospital, Uttarakhand Ayurveda University, Haridwar, India.

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