



MODIFICATION OF RECONSTRUCTION SURGERY FROM ANCIENT INDIA

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ABSTRACT

Reconstruction surgery or plastic surgery seems to be an invention of the modern age. But one of the earliest instances of plastic surgery can be found in the *Sushruta Samhita*, an important medical text from India. The desire to attain physical beauty is one of the factors to increase popularity of this procedure. Plastic surgery has made great progress in the past two hundred years. Basically, the task of plastic surgery is to restore the destroyed or damage parts of the body by disease or injury. But in recent years "cosmetic surgery" as beauty treatment has become very fashionable. Anyway, we should always remember that the sources of modern plastic surgery are the *Sushruta - Sanhita* and it was from India, where the Europeans learnt the technique of rhinoplasty. Therefore, we have to reinvent our own stream of knowledge.

Keywords: plastic surgery, rhinoplasty, cosmetic surgery.

INTRODUCTION

The term 'plastic surgery' has nothing to do with artificial substances – it derives from the Greek word 'plastikos', meaning 'able to be moulded or formed'.

It is concerned with modifying deformations that have been caused by disease or injury, and the basic principles behind it had been discovered in ancient India.

Plastic surgery is a very old science. It is, however, difficult to say when the first plastic operations on man were performed. Primitive man knew how to do grafting in plants. This might have given him the idea of transferring tissues in man and animals. The necessity arose when he lost parts of his body such as the nose, ear, lips etc, which has been a common form of injury in all periods of history. In olden days, removal of the nose was also one of the most common forms of punishment. Thus, it became a social necessity to find a substitute for the lost nose.

One of the eight branches of *Ayurveda*, the Indian system of medicine, is *Shalyatantra*, the practice of surgical techniques. *Sushruta Samhita* is one of the foundational texts of the *Ayurveda*, the traditional medical system of India. The *Sushruta Samhita*, in its existing form, is said to consist of 186 chapters containing descriptions of several hundred types of illnesses, drugs made from animals, plants and minerals. There is detail description of reconstruction surgeries of nose, ear and lip. The development of plastic surgery is closely connected with the operative techniques used in the field known as rhinoplasty in ancient India.

From 1769 AD to 1799 AD, in a period of thirty years, four Mysore Wars were fought between 'Hyder Ali' and his son 'Tipu Sultan' and the 'British'. As a result of these wars the British learnt two very important Indian techniques - rocketry and plastic surgery. Both these Indian techniques were further improved first in England and then in other European countries¹.

❖ Reconstruction surgeries in ancient period

The *Sushruta Samhita*'s most well-known contribution to plastic surgery is the reconstruction of the nose, known also as rhinoplasty. The process is described as such²:

1. The portion of the nose to be covered should be first measured with a leaf. Then a piece of skin of the required size should be dissected from the living skin of the cheek, and turned back to cover the nose, keeping a small pedicle attached to the cheek.

2. The part of the nose to which the skin is to be attached should be made raw by cutting the nasal stump with a knife.
3. The physician then should place the skin on the nose and stitch the two parts swiftly, keeping the skin properly elevated by inserting two tubes of *eranda* (the castor-oil plant) in the position of the nostrils, so that the new nose gets proper shape.
4. The skin thus properly adjusted, it should then be sprinkled with a powder of liquorice, red sandal-wood and barberry plant.
5. Finally, it should be covered with cotton, and clean sesame oil should be constantly applied.
6. When the skin has united and granulated, if the nose is too short or too long, the middle of the flap should be divided, and an endeavour made to enlarge or shorten it.

The similar technique uses for cleft lip reconstruction without using tubes³. These procedures are reinvented by modern plastic surgeons.

Reconstruction of Ear⁴:

There were fifteen methods for reconstruction of ear -

1. ***Nemisandhanak*** - indicated when both the flaps of the spit ear are thick, wide and equal. *Nemi* i.e. unified like circumference (rim) of a wheel. unification is done
2. ***Utpalbhedak*** -when both the flaps are round wide and equal like a lotus, they can be unified symmetrically.
3. ***Vallurak*** - indicated when both the flaps short, round and equal. *Vallurak* is that unified by numerous cutting like dried meat, so that the elongation and extension of the flaps occur to acquire the expected ear length.
4. ***Asangim***- long one inner flap, because of absence of outer flap it gets closely adheres to its root. The long inner flap may be folded outside to take the place of outer flap to make the shape of ear lobe.
5. ***Gandkarn***- long outer flap, the front portion of the long outer flap is unified with taking out the cheek muscle with attachment.

6. **Aaharya-** little flap on either side, so for that small flaps from both sides cheek muscles with attachment is taken out and shaping it like a pinna
7. **Nirvedhima-** having flat flaps like a wooden seat attached to tragus. Where both the flaps are cut from the root and as flat as wooden seat, this is unified by piercing over the tragus and be enlarged.
8. **Vyayojima** - one flap even in terms of thickness or thinness while the other one is uneven. They are arranged in various ways by scraping.
9. **Kapatsandhik-** inner flap long and outer one short or if outer flap cut by chance the inner flap closely adheres to its root.
10. **Ardhakapatsandhik-** outer flap long and the inner one short
11. **Sankshipt-** when there is dried up pinna, one flap raised and other one short.
12. **Hinakarna-** flaps without base and having atrophy of muscles on both sides.
13. **Vallikarn-** flaps thin, uneven and short.
14. **Yashtikarna-** flaps small, full of knotty muscles and stiffed vessels.
15. **Kakausthaka-** is indicated when flaps are emaciated with shortened tip and less vascular.

Modern Methods of skin grafting^{5,6}:- Skin loss can be made good by the following technique-

1. **Local adjustment (by flaps) from surrounding skin**-this method has an obvious advantage that as the blood supply of the flap remains as it is, the same method was told by *Susrutacharya* in the reconstruction of the ear. These techniques were implemented in ancient India, and the *Acharya*'s knows that if the blood supply of the recipient area graft is proper then the graft acceptance chances are more. This is the revolutionary idea for the modern reconstructive surgery. There are different methods of reconstruction by local adjustment in modern medicine as follows-
 - a) **Simple undermining** – In this method the adjacent skin margins are freed from underlying subcutaneous tissues as much as possible to cover the defect without tension.

b) V-Y Adjustment- 'V' shaped incision is made a little below the wound with its open ends towards the wound. The edges of the incision as well as of the wound are undermined. The wound is closed in such manner that the V shaped incision is turned into a Y form.

c) Rotation flap– it can be used to close larger defects which are particularly of triangle is extended by an incision, undermined and the skin flaps can be brought over the defect. This technique may be inspired from *Gandkarnaand, Aaharya* methods of ear reconstruction of *Sushrutacharya*

d) Z-plasty- this is mostly used in palms. It can be used where linear scar has been excised leading to a linear skin loss.

2. **Free skin grafts**- The graft is taken from other parts of body. This technique may be inspired from Nose and Lip reconstruction of *Sushrutacharya*
3. **Pedicle grafts**-where flap remains attached to the original site of one end and the other to the place to be grafted. This technique may be inspired from *Gandkarna* and *Aaharya methods* of ear reconstruction also Nose and Lip reconstruction of *Sushrutacharya*

DISCUSSION

The Edwin Smith Papyrus about 3000 BC - the world's oldest surviving surgical document – having details practical treatments to illnesses and injury but does not mention plastic or reconstructive surgery like the *Sushruta Samhita*. Written in hieratic script in ancient Egypt⁷. Reconstructive surgery had been practised in India for more than 2000 years, but it was a medical feat unknown in the West. When an account of a grafting operation was published in the Gentleman's Magazine of London in October 1794, it attracted much interest. It was not until the 18th century that plastic surgery gained real acceptance in Western Europe. Some surgeons carrying out amputations on ships or in field hospitals were aware that skin could re-attach itself to flesh. But the auto- graft technique is the first described in *Sushruta Samhita*. Other contrib-

butions of the *Sushruta Samhita* towards the practice of plastic surgery include

1. The use of cheek flaps to reconstruct absent ear lobes.
2. The use of wine as anaesthesia
3. Use of leeches to keep wounds free of blood clots.
4. In addition, *Sushruta* taught that in order to be a good doctor, one should possess medical knowledge in both its theoretical and practical forms.
5. 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.
6. *Sushruta* compiled an encyclopaedia of medical treatments. It contained detailed anatomical information and descriptions of much more surgical procedures, among them the first descriptions of rhinoplasty and otoplasty
7. There was also a demand for ear reconstruction from adults and children whose heavy ear jewellery had split and infected their ear lobes. *Sushruta's* discourse implies that this was a common problem, easily remedied by taking skin from the cheek and suturing it into the torn lobe.
8. Before the amputation, skin could be trimmed from the leg or arm to fold back over the stump
9. Cauterising 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. Due to leech thrombolysis

of the micro thrombi in the vessels can occur, because of presence of the anticoagulant enzymes in the leech saliva. Also having the wholesome diet before skin grafting. So, there are many more important things mentioned by our *Acharyas*. Therefore, there is modification of reconstruction surgeries from ancient India.

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