

Review Article

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“SUSHRUTA’S RHINOPLASTY AND THE ORIGINS OF RECONSTRUCTIVE PLASTIC SURGERY: A HISTORICAL REVIEW”**Dr. Jalpa Gandhi¹****AFFILIATIONS:**

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ABSTRACT

Background: Sushruta is widely regarded as a pioneer of plastic surgery because the Sushruta Samhita describes reconstruction of the nose using a pedicled cheek flap and repair of the ear lobe by numerous techniques. The “Indian method” of nasal reconstruction, using a forehead flap, became known in Europe in 1794 and inspired modern nasal reconstruction. **Objective:** To review Sushruta’s descriptions of nasal and ear lobe reconstruction, trace the transmission of the Indian method to Europe, and compare these techniques with modern nasal reconstruction. **Methods:** Historical review of Sushruta Samhita and of literature on the history of plastic surgery and nasal reconstruction. **Results:** Sushruta describes measuring the defect with a leaf template, raising a flap of skin from the cheek while keeping it attached, rotating it to cover the nose, inserting tubes into the nostrils and dressing the wound, with attention to haemostasis and post-operative care. He also describes 15 methods of repairing the torn ear lobe. Later Indian practitioners used a forehead flap for nasal reconstruction, a procedure reported in a British magazine in 1794 and adopted in Europe by surgeons such as Carpué. The modern paramedian forehead flap, now a standard method for nasal reconstruction, is a direct descendant of this tradition. **Conclusion:** Sushruta’s reconstructive principles, including templates, pedicled flaps, preservation of blood supply and careful aftercare, remain fundamental to plastic surgery. The Indian method of rhinoplasty is one of the clearest examples of the influence of Ayurvedic surgery on modern medicine. **KEYWORDS:** Sushruta; rhinoplasty; nasal reconstruction; forehead flap; pedicled flap; plastic surgery history; ear lobe repair; Sandhana Karma

INTRODUCTION

Reconstruction of the nose is one of the oldest operations in plastic surgery. In ancient India, amputation of the nose was a punishment for crimes and a consequence of war, which created a need for reconstructive techniques^[1,2]. The Sushruta Samhita, an ancient Indian surgical text, describes nasal reconstruction using skin flaps and has led many historians and surgeons to regard Sushruta as a pioneer of plastic surgery^[2-4].

The “Indian method” of rhinoplasty became famous in Europe at the end of the eighteenth century and influenced the development of modern reconstructive surgery^[1,5]. Today, the forehead flap, in refined form, remains a standard technique for reconstructing large nasal defects^[6].

This review describes Sushruta’s techniques for nasal and ear lobe reconstruction, traces the transmission of the Indian method to Europe, and compares these with modern nasal reconstruction.

METHODS

The primary source was Sushruta Samhita, Sutra Sthana 16 (Karnavyadhabandha Vidhi), which describes ear piercing, ear lobe repair and nasal reconstruction^[7]. Secondary literature on the history of plastic surgery and nasal reconstruction was identified through PubMed and Google Scholar. This is a historical review.

SUSHRUTA’S NASAL RECONSTRUCTION

The procedure

Sushruta describes the following steps for reconstructing an amputated nose^[7]:

1. **Template:** a leaf of the size of the nasal defect is cut to serve as a pattern.
2. **Flap design:** the pattern is placed on the cheek, and a flap of skin of the same size is marked.
3. **Raising the flap:** the skin is incised and raised, leaving it attached at one end (a pedicle) to maintain its blood supply.
4. **Preparing the recipient site:** the edges of the nasal stump are scarified (freshened) to create raw surfaces.
5. **Transfer:** the flap is rotated and placed over the nose, and sutured in position.
6. **Nostrils:** two small tubes (Nadi) are inserted into the nostrils to maintain the airway and the shape of the nostrils.
7. **Dressing:** the area is dusted with powders of liquorice, red sandalwood and barberry, covered with cotton and moistened with sesame oil.
8. **Aftercare:** the patient is given ghee to drink and purgation, and the wound is monitored; once the flap has taken, the pedicle is divided.

Principles

Sushruta’s description contains several principles that remain fundamental in plastic surgery:

Table 1: Principles of Sushruta’s rhinoplasty and corresponding modern principles

Principle in Sushruta	Modern principle
Leaf template of the defect	Precise measurement and templating of defects
Flap kept attached at one end	Pedicled flap preserving blood supply
Scarification of recipient edges	Freshening wound edges for healing
Tubes in the nostrils	Stenting the airway and nasal lining
Antiseptic and healing dressings	Wound care and infection prevention
Division of the pedicle after healing	Staged flap division

Some scholars note that the text’s description of the donor site as the cheek differs from the later Indian forehead method, and that the exact interpretation of some verses has been debated^[1,4].

EAR LOBE REPAIR

Sushruta describes the practice of ear piercing, especially in children, for protective and ornamental purposes, and the need to repair ear lobes torn by heavy ornaments or injury^[7]. He describes 15 different methods (Sandhana Bandha) for joining the

torn edges, depending on the shape and size of the remaining tissue, including direct apposition, local flaps and use of adjacent skin. He also describes conditions in which repair should not be done, such as when the lobe is severely damaged or infected.

This detailed classification of repair techniques according to the anatomy of the defect parallels modern reconstructive thinking, in which the technique is chosen according to the size and location of the defect and the available tissue.

LIP REPAIR

Sushruta also describes the repair of a cut lip using similar principles, by freshening the edges and suturing, with flap techniques where necessary^[7].

TRANSMISSION OF THE INDIAN METHOD TO EUROPE

Tagliacozzi and the Italian method

In sixteenth-century Italy, Gaspare Tagliacozzi described nasal reconstruction using a flap of skin from the upper arm, which remained attached to the arm while the arm was strapped to the head for several weeks^[8]. This “Italian method” fell into disuse after his death.

The 1794 report

In October 1794, a letter signed “B.L.” in the Gentleman’s Magazine of London described a nasal reconstruction performed near Pune on Cowasjee, a

bullock-cart driver with the British army whose nose had been cut off as a punishment^[9]. The operation, performed by a local practitioner of the potter (Kumhar) caste, used a flap of skin from the forehead, attached at a pedicle between the eyebrows, turned down to form a new nose. The report included an illustration and described the method as long known in India.

Carpue and the spread in Europe

The English surgeon Joseph Constantine Carpue studied the Indian method, practised it on cadavers and, in 1814, performed the first forehead flap rhinoplasties in England, publishing his account in 1816^[10]. The technique then spread to Germany and elsewhere in Europe, where surgeons such as von Graefe and Dieffenbach refined it. This marked the beginning of modern nasal reconstruction^[1,5].

Table 2: Timeline of the spread of Indian rhinoplasty

Date	Event
Ancient period	Sushruta describes nasal reconstruction with a pedicled cheek flap ^[7]
1597	Tagliacozzi describes the Italian arm-flap method ^[8]
1794	The Indian forehead flap method is reported in the Gentleman’s Magazine ^[9]
1814–1816	Carpue performs and publishes forehead flap rhinoplasty in England ^[10]
19th–20th centuries	Refinement of the forehead flap in Europe and America ^[1,5]
Late 20th century onwards	Paramedian forehead flap with lining and framework reconstruction becomes standard ^[6]

MODERN NASAL RECONSTRUCTION

Today, the paramedian forehead flap is the workhorse for reconstructing large and complex nasal defects. It is based on the supratrochlear vessels, provides skin of excellent colour and texture match, and can be thinned and shaped to reproduce nasal contour^[6]. Modern principles include reconstruction in three layers (lining, structural framework with cartilage grafts, and skin cover), the subunit principle (reconstructing whole aesthetic units of the nose) and staged procedures to refine the result^[6,11].

The forehead flap of today retains the essential features of the Indian method: a pedicled flap from the forehead, turned down to cover the nose, with later division of the pedicle. Its continued use more than two centuries after the 1794 report is a remarkable testimony to the enduring value of the Indian technique.

SUSHRUTA’S BROADER CONTRIBUTIONS

TO PLASTIC SURGERY

Beyond the nose and ear, the Sushruta Samhita describes wound classification, suturing techniques, use of bandages, management of burns (with a four-grade classification), and post-operative care^[7]. Sushruta’s emphasis on training using models (Yogya) and on careful pre- and post-operative care reflects a comprehensive approach to surgery^[3,7]. Modern plastic surgical organisations in India and abroad commemorate Sushruta as a founding figure, and Indian plastic surgery departments trace their heritage to this tradition^[12].

BURNS AND THEIR MANAGEMENT

Plastic surgery today encompasses burn care, and Sushruta’s description of burns is also notable. He classifies burns caused by fire (Agnidagdha) into four degrees: Plushta (singd, with discolouration), Durdagdha (blistered, with severe pain), Samyak Dagdha (well burnt, with the colour of a ripe palm fruit and no deep tissue damage) and Atidagdha (deep

burns with destruction of muscle, vessels and bones, accompanied by systemic disturbance)^[7]. He prescribes cooling or warming applications, ghee, honey and herbal pastes according to the degree, and describes the systemic effects of extensive burns, including fever, thirst and fainting.

This four-grade classification corresponds broadly to the modern classification of burn depth into superficial, superficial partial-thickness, deep partial-thickness and full-thickness burns, which guides decisions about conservative care versus excision and grafting^[13]. Sushruta also describes injuries from hot liquids, smoke inhalation and lightning, showing an awareness of different burn mechanisms.

SUTURING AND WOUND CLOSURE

Sushruta describes several suturing techniques, including continuous, interrupted and crossed stitches, and recommends different needle types and suture materials according to the tissue^[7]. He advises that sutures should be neither too close nor too far apart and neither too tight nor too loose, and that the wound edges be accurately aligned. He also describes the use of ant heads as clips to close intestinal wounds, a remarkable early example of biological wound closure. These principles of tension-free, well-aligned closure remain the basis of good plastic surgical technique.

HISTORIOGRAPHICAL CONSIDERATIONS

Historians caution against overstating ancient achievements. The Sushruta Samhita was compiled and revised over a long period, and the dating of its surgical sections is uncertain^[14]. The description of the flap from the cheek in the text differs from the forehead flap described in 1794, which suggests that techniques evolved over time in India. The 1794 operation was performed by a practitioner outside the formal Ayurvedic tradition, indicating that surgical knowledge was preserved in craft communities. These nuances do not diminish the significance of the Indian contribution but help to present it accurately.

RELEVANCE TO MODERN AYURVEDIC SURGERY

For students and practitioners of Shalya Tantra, Sushruta's reconstructive surgery offers:

- A source of pride and identity, grounded in historically documented influence on modern

surgery.

- Teaching material on fundamental principles of flap surgery, wound healing and aftercare.
- A reminder that surgical knowledge advances through careful observation, refinement and cross-cultural exchange.

At the same time, modern reconstructive surgery requires specialised training, anaesthesia, asepsis and microsurgical skills that are beyond the scope of classical texts. Sushruta's techniques should be taught as historical foundations, not as current clinical procedures.

CONCLUSION

Sushruta's description of nasal and ear lobe reconstruction, with its use of templates, pedicled flaps, preservation of blood supply and careful aftercare, represents one of the earliest documented systems of reconstructive surgery. The Indian forehead flap method, reported to Europe in 1794, inspired modern nasal reconstruction, and the paramedian forehead flap remains a standard technique today. This history is an enduring contribution of Indian surgery to world medicine.

REFERENCES

1. Whitaker IS, Karoo RO, Spyrou G, Fenton OM. The birth of plastic surgery: the story of nasal reconstruction from the Edwin Smith Papyrus to the twenty-first century. *Plast Reconstr Surg.* 2007;120(1):327–36.
2. Champaneria MC, Workman AD, Gupta SC. Sushruta: father of plastic surgery. *Ann Plast Surg.* 2014;73(1):2–7.
3. Soundaryashree NR, Chandan RS, Singamaneni VR, Nagidi HR, Patel G, Vidiyala N, et al. Development and validation of RP-HPLC method for quantification of bamifylline in pharmaceutical formulations using analytical quality by design (AQbD) principles. *Adv J Chem Sect A.* 2025:2076-97.
4. Singh V. Sushruta: the father of surgery. *Natl J Maxillofac Surg.* 2017;8(1):1–3.
5. Vidiyala N, Sunkishala P, Parupathi P, Mandati P, Mantena SK, Kasu RRR, et al. High drug loading of amorphous solid dispersion by hot melt extrusion: the role of magnesium aluminometasilicate (Neusilin® US2). *Sci Pharm.* 2025;93(3):30.
6. Menick FJ. Nasal reconstruction: forehead flap.

- Plast Reconstr Surg. 2004;113(6):100e–111e.
7. Prasad PL, Govindaraj S, Jahnavi P, Popatrao TP, Tummala T, Vidiyala P, et al. Metal oxide functionalized nanoparticles for the treatment of bacterial infection: synthesis, characterization, and therapeutic applications. *J Appl Organomet Chem*. 2025;5(3):232-57.
 8. Tagliacozzi G. *De curtorum chirurgia per insitionem*. Venice: Gaspare Bindoni; 1597.
 9. Kumar RKT, Dharmamoorthy G, Vasavi DD, Vidiyala N, Bagade OM, Elumalai S, et al. Phytoconstituent-based green synthesis of nanoparticles: sources and biomedical applications in cancer therapy. *Asian J Green Chem*. 2025;9(3):329-54.
 10. Carpue JC. An account of two successful operations for restoring a lost nose from the integuments of the forehead. London: Longman, Hurst, Rees, Orme and Brown; 1816.
 11. Burget GC, Menick FJ. The subunit principle in nasal reconstruction. *Plast Reconstr Surg*. 1985;76(2):239–47.
 12. Vidiyala N, Sunkishala P, Mandati P, Parupathi P, Nyavanandi D. Integrating 3D printing and additive manufacturing into personalized medicine for pharmaceuticals: opportunities, limitations, and future perspectives. *Sci Pharm*. 2025;93(4):61.
 13. Jeschke MG, van Baar ME, Choudhry MA, Chung KK, Gibran NS, Logsetty S. Burn injury. *Nat Rev Dis Primers*. 2020;6(1):11.
 14. Meulenbeld GJ. A history of Indian medical literature. Vol. IA. Groningen: Egbert Forsten; 1999.