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# FROM INDIA TO ITALY: SUSRUTA'S INFLUENCE ON ITALIAN RHINOPLASTY

by

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## Abstract

Today we are all familiar with rhinoplasty's ability to transform a person's facial features. While many contributed to the development of rhinoplasty, two individuals are greatly credited with its advent: Susruta, an Indian physician (800 BC – 400 AD), and Gaspare Tagliacozzi, an Italian surgeon (1545-1599 AD). While their works are well known today, a possible connection between them is not. This paper attempts to illustrate whether a relationship between the Italian and Indian methods of nasal reconstruction can be traced. Sources used in this endeavor include English translations of Susruta's treatise, *Susruta Samhita*, Tagliacozzi's work, *De Curtorum Chirurgia*, as well as works from other 13<sup>th</sup> –16<sup>th</sup> century Italian surgeons. It is shown that the translation of *Susruta Samhita* into Arabic and the spread of the Persian Empire may have brought the Indian method of rhinoplasty to the 13<sup>th</sup> century Sicilian surgeons known as the Brancas. The development of the Italian method of rhinoplasty, which is described by Tagliacozzi in *De Curtorum Chirurgia*, is then outlined. Tagliacozzi's intention to openly share the Italian rhinoplastic procedure is discussed as is the impact of the decline of surgery in Europe on the spread of Tagliacozzi's work. The re-introduction of the Indian method of nasal reconstruction in Europe through an anonymous letter published in the October 1794 issue of England's *Gentleman's Magazine* is then explored. Through the course of these discussions, the catalytic role of the Indian method of rhinoplasty in the development of the Italian version of nasal reconstruction is demonstrated.

## Susruta and Tagliacozzi's Contributions to Rhinoplasty

There were many causes of nose mutilation in ancient India that led to the need for reconstructive surgery. Of these, the most common were accidents, physical altercations and punishment (Almast 1969, Castiglioni 1958, Kutumbiah 1969). Susruta (800 BC – 400 AD), an Indian surgeon whose dates cannot be precisely determined, provided the

first account of rhinoplasty using a skin graft (Almast 1969, Goyal 1986, Girindranath 1974). In his 120-chapter treatise, *Susruta Samhita*, Susruta describes his method in detail:

Now I will describe the method of joining the mutilated nose – A leaf of a tree should be taken and cut into the shape (and size) of the nose, this is placed on the cheek, then the cheek muscle is cut into the same size: raising a flap of it and maintaining the connection with the live muscles, the flap is placed quickly on the mutilated nose (damaged portion) after scraping it (causing bleeding), then a suitable bandage tied, inserting two tubes into the nose (one to each nostrils)... After the union has healed, the flap of muscles should be cut at half its length allowing the remainder intact. If the repaired nose is short, attempt should be made to augment its growth and if there is excess growth, it should be made even (to the normal size by cutting or scraping) (Murthy 2000).

For several centuries, this was the only rhinoplastic method using skin grafting to be recorded (Seltzer 1949).

Over a thousand years later, in 1597 AD, the Italian surgeon Gaspere Tagliacozzi (1545 – 1599 AD) published *De Curtorum Chirurgia per Insitionem Libri Duo*, a work devoted to plastic surgery (Tagliacozzi 1597). While it was well known that Tagliacozzi was not the inventor of plastic surgery procedures (De Vecchi 1922, Furlan 1995), he was the first to scientifically describe the practiced methods (Castiglioni 1958). In *De Curtorum Chirurgia*, he describes a rhinoplastic procedure where a skin graft from the arm is used to reconstruct a nose. In this method, skin fitted to replace the nose is taken from the anterior brachial region of either arm. The arm is brought close to the face and the skin is sutured to the nose region after it has been scraped. The patient is fitted with a bandage apparatus that holds the arm and face in close proximity for a number of days while the graft begins to grow on the face. Then the face is released from the arm and the free end of the graft is shaped into a nose. This technique of nasal reconstruction is now known as the Italian method (Gnudi 1950, Tagliacozzi 1597).

Unlike other Europeans who performed rhinoplasty, Tagliacozzi aimed to share his knowledge rather than keep it secret. In 1586, prior to the publication of *De Curtorum Chirurgia per Insitionem Libri Duo*, Tagliacozzi wrote a letter to Mercuriale, an Italian physician who requested a description of the rhinoplastic procedure. Tagliacozzi responded with a complete description and in closing stated,

But I think I have written more than a letter now: if I have not completely satisfied you, illustrious Sir, I shall in my treatise, which contains all the secrets and rites of the art ... and I shall rejoice to offer it to the use of all mankind. For I am not such as to wish that this art should remain with me in shackles, so to speak, but desire that it should go far and wide, even among other peoples (Gnudi 1950).

In publishing a detailed description of the Italian rhinoplastic method, Tagliacozzi's role was to make it available to wide audience.

Given that the Indian method of rhinoplasty was practiced for over a millennium prior to the publication of *De Curtorum Chirurgia*, one may wonder whether it had a role in the development of the of Italian rhinoplasty. Furthermore, one may question whether Tagliacozzi was familiar with Susruta's work.

### **The Translation of Susruta Samhita and the Conquest of Sicily**

Arab settlers are thought to have arrived in India between the 7<sup>th</sup> and 8<sup>th</sup> century AD (Goyal 1986). In the 9<sup>th</sup> century, many Indian publications were translated into Arabic (Kutumbiah 1969) and the works of Ibn Sina (Avicenna), Ibn Abi (Usaybia), and Rhazes mention Susruta in their contents (Almast 1969, Gnudi 1950). Additionally, in 800 AD, Kaliph Al-Mansur ordered the translation of Susruta's work into Arabic making it accessible to a larger population (Gnudi 1950).

During this time, the Arab empire was expanding from Persia to North Africa and into Europe. The Arab conquest of Sicily, however, is of particular interest. Arab raids of Sicily began in 652 AD and, by 700 AD, Pantelleria, a small island between Tunisia and Sicily, was conquered by Arab forces. Over the next 50 years, Arab raids of Sicily became common. In 827 AD, Admiral Euphemius revolted against the Byzantine Emperor, Michael II, and captured Sicily. In order to maintain his rule over Sicily he requested help from the Arab Ahglabid Emir. This alliance eventually allowed for the Arab colonization of Sicily. By 831 AD, Palermo was under Arab rule with Messina to follow in 843 AD. The fall of Syracuse in 878 AD is commonly accepted as the fall of ancient Sicily, although the final town of Taormina was not captured until 902 AD. From this time until the Norman invasion in 1060 AD, the Arabs occupied Sicily (Finley 1968, Sammartino 1992). It is speculated that the Arab colonization in Sicily allowed for the introduction of Susruta's surgical methods to the island (Castiglioni 1958), although there is no concrete evidence of their practice during this time.

A second possible route by which Susruta's methods may have entered Sicily is through Constantine the African (1020 – 1087 AD). In the 11<sup>th</sup> century, he translated numerous Arabic works into Latin and was known to have traveled to India. Furthermore, he was secretary to Robert Guiscard (1015 – 1085 AD), the Norman Ruler of Sicily (Campbell, 1926). As such, Constantine the African had ample opportunity both to both learn of Indian rhinoplasty and to bring it to Sicily.

## The Development of the Italian Method of Rhinoplasty

The first European surgeons reported to perform rhinoplasty using skin grafts were the Branca's of Catania, Sicily, in the 15<sup>th</sup> century AD (De Vecchi 1922, Gabke 1983, Gnudi 1950). This father and son duo was likely the link between Susruta and Tagliacozzi. The older Branca first performed rhinoplasty in a fashion very similar to Susruta by using a flap of skin from the cheek (Gabke 1983). The younger Branca, Antonio, abandoned his father's method when he began to perform surgeries using skin from the arm. Unfortunately, no writings from the Branca's have been found. The most detailed description of their work comes from Bartolomeo Fazio, a historian who states:

Branca, the elder, and Antonius Branca, his son, Sicilians. In speaking of this century, I have thought both Branca and his son especially worthy to be remembered because Branca, the elder, was the inventor of an admirable and almost incredible thing. He conceived how he might repair and replace noses that had been mutilated and cut off and developed his ideas into a marvelous art. And the son added not a little to his father's wonderful discovery. For he conceived how mutilated lips and ears might be restored, as well as noses. Moreover, whereas his father had taken the flesh to repair from the mutilated man's face, Anontius took it from the muscles of the arm, so that no distortion of the face should be caused (Gnudi 1950).

As no original writings from either of the two Branca's have been discovered, it is not known with certainty that the older Branca was aware of Susruta's work. However, given the similarities between Branca's and Susruta's methods, the translation of Susruta's work to Arabic and the Arab colonization of Sicily, one may be suspicious that Branca did learn of the Indian method of rhinoplasty (Gabke 1983, Seltzer 1949). If so, within two generations of the Branca family, Susruta's method of rhinoplasty was awakened in Europe and transformed into what is today known as the Italian method of rhinoplasty.

Following the work of the Branca's, the Italian method rapidly began to spread across the southern part of the country. Alexander Benedictus (Alessandro Venedetti), a physician practicing in Padua, states in his 1497 publication, *Anatomice, Sive Historia Corpis Humani*,

In our time, skilful persons have taught us how to rectify deformities of the nose. Portions of the flesh, cut from the arm of the patient, formed into the shape of nostrils, and added to the trunk of the nose, are very commonly seen (Carpue 1816).

One such family of surgeons practicing the Italian method of rhinoplasty was the Vianeo family of Calabria. The art was first practiced by Vincenzo Vianeo who passed the practice to nephew Bernardino Vianeo. Bernardo moved to Tropea where he taught his sons, Paolo and Pietro, the surgical method that was privy to members of the Vianeo family (Santoni-Rugiu 1997).

A detailed description of Vianeo's version of the Italian method comes from Leonardo Fioravanti of Bologna. In 1549, under the guise of a relative of a potential Bolognese patient, Fioravanti gained access to observe live nose reconstructions by Pietro and Paolo Vianeo. In his book, *Il tesoro della vita humana*, he states,

And every day I went to the house of these surgeons who had five noses to reconstruct, and when they wanted to perform these operations they called me to watch, and I, pretending that I had not the courage to look at it, turned my face away, yet my eyes saw it very well - and thus I saw the whole secret from top to toe. The procedure is as follows: The first thing they did to the person on whom they wished to perform such an operation was to give a purgative, and then in the left arm, between the shoulder and the elbow, they took hold of the skin with pincers, and they passed a large knife between the pincers and the flesh of the muscle, and there they passed a small piece of wool or a piece of linen, and they medicated it until the skin became very thick and, once it was thick enough, they cut the nose similarly, and they cut that skin at one end and sutured it to the nose and bound it with such artifice and skill that it could not be moved in any way until the skin had grown into the nose; and when it had grown on, they cut the other end and freshened the lip of the mouth and sewed there the skin of the arm (Santoni-Rugiu 1997).

In 1568, after having learned the Italian method, Fioravanti returned to Bologna where Tagliacozzi was a medical student. It is possible that at this time that the paths of Tagliacozzi and Fioravanti may have intersected, though no known record of this has been found (Santoni-Rugiu 1997).

### **Hints from *De Curtorum Chirurgia per Insitionem Libri Duo***

Tagliacozzi was well informed about the development of plastic surgery in Europe. He saw his role not as that of the inventor of plastic surgery but as one who refined and described successful methods of plastic surgery. To this point, chapter 19 of *De Curtorum Chirurgia* is dedicated to "What the ancients and more recent authors have written on the restoration of defective parts and whether our principles agree with theirs" (Gnudi 1950). In his work, writings of Galen and Celsus are mentioned as those of the ancients. In addition, the work of the Branca's and other contemporaries are mentioned (Gnudi 1950, Santoni-Rugiu 1997). However, Susruta does not make an appearance in Tagliacozzi's work. Based on Tagliacozzi's readiness to credit those who contributed to his knowledge, one may believe that he did not know of his Indian predecessor.

After describing previous methods applied for facial reconstructive surgery in chapter 19 of his book, Tagliacozzi states,

The surgery of repairing defects proposed by early and modern men differs by the whole space of heaven from this our surgery disagrees completely with it. For the ancients did not take the graft from elsewhere, but drew it over from the adjacent parts, after the skin had been slightly loosened;

whereas we cut it from neighboring regions, as in the case of ears, and from remote and distant limbs, as when we bring skin from the upper arm for the restoration of the nose (Gnudi 1950).

Upon quick glance, one may think that Tagliacozzi is referring to Susruta as an ancient who drew the graft “from the adjacent part,” which would include the cheek. There are some arguments that could be used to defend otherwise. First, Tagliacozzi previously in the chapter refers to Celsus and Galen as ancients. Galen and Celsus both used adjacent tissue to repair nose deformities but did not rotate the material or separate it from the underlying tissue (Carpue 1816). In addition, Tagliacozzi states that the ancient methods of plastic surgery “differ completely” with modern methods. One of these differences is that skin was “cut from neighboring regions” in the modern methods but not in the ancient procedures. Susruta’s method of rhinoplasty also cut skin from neighboring regions, which renders it more similar to the modern methods he discusses. Based on these arguments, it is likely that Tagliacozzi is referring to Celsus’s and/or Galen’s methods of rhinoplasty rather than Susruta’s when discussing the ancient methods of reconstructive surgery. It is unlikely that Tagliacozzi was aware of Susruta and Indian rhinoplasty.

### **The Re-Introduction of Indian Rhinoplasty to Europe**

Unfortunately, Tagliacozzi’s methods of facial reconstruction were not widely adopted outside of Italy. In the late 16<sup>th</sup> century, the Church prohibited plastic surgery and in 1788 the Paris faculty interdicted reconstructive surgery of the face (Seltzer 1949). Tagliacozzi’s methods, however, were known in Western Europe by the 18<sup>th</sup> century as they were mentioned in the *Dictionnaire Historique de la Medicine*, published in Mons in 1778, and in John Hunter’s, *A Treatise on the Blood, Inflammation and Gun-shot Wounds*, printed in 1794 in London (Carpue, 1816). The 1792 version of *Encyclopedie Methodique*, printed in Paris, discusses the Italian method of rhinoplasty and says,

The method has not got into vogue, because it has been thought much more easy to remedy the defect by an artificial nose, than by this painful operation, of which success is anything but certain (Carpue 1816).

This demonstrates both a knowledge and distrust of Tagliacozzi’s techniques in 18<sup>th</sup> century Western Europe. One of the major events that led to Tagliacozzi’s rise in popularity in the 19<sup>th</sup> century was the reintroduction of Indian rhinoplasty.

In October 1794 an anonymous letter, signed B.L., was published in the *Gentleman’s Magazine* of England.

Dear Mr. Urban,

A friend has transmitted to me, from the East Indies, the following very curious, and in Europe, I believe, unknown surgical operation, which has long been practiced in India with success, namely affixing a new nose on a man's face.

The letter goes on to detail the story of Cowasjee, a Mahratta bullock driver for the English army. Cowasjee was captured by a rival, Tippoo, and had his nose and hand cut off in 1792. One year after the incident, Cowasjee had "a new nose put on by a man of the Brickmaker cast" near Poonah. The two English medics, Thomas Cruso and James Findlay, witnessed the procedure. B.L. goes on to describe the procedure in detail.

A thin plate of wax is fitted to the stump of the nose of a good appearance; it is then flattened and placed on the forehead. A line is drawn around the wax, and then the operator then dissects off as much skin as it covered, leaving undivided a small slip between the eyes. This slip preserves the circulation till a union has taken place between the new and old parts. The cicatrix of the stump of the nose is next pared off and immediately behind this raw part an incision is made through the skin, which passes around both aloe, and goes along the upper lip. The skin is now brought down from the forehead, and, being twisted half around, its edge is inserted into this incision, so that a nose is formed with a double hold above, and with its aloe and septum below fixed in the incision. A little Terra Saponica is softened with water, and being spread on cloth, five or six of these are placed over each other to secure the joining ... on the tenth day, bits of soft cloth are inserted into the nostrils, to keep them sufficiently open. This operation is generally successful (BL 1794).

This described procedure is very similar to that described in the *Susruta Samhita* with the exception that the graft is now taken from the forehead. The details surrounding the transition of the graft, from cheek to forehead, in Indian rhinoplasty are not well known. Vagbhata (700-900 AD), an Indian surgeon, describes Susruta's rhinoplastic methods in *Astanga Hrdaya* where the skin graft is taken from the cheek (Almast 1969, Girindranath 1974). The earliest reports of forehead flaps come from a family of Hakim nose surgeons called Kanghiaras who performed the surgeries as early as the 1400s (Almast 1969).

The publication of B.L.'s letter suddenly drew considerable European interest to rhinoplasty and Tagliacozzi (Hayes 1986). In Thomas Pennant's *View of Hindoostan*, published in 1798, attention is given to the practice of rhinoplasty in India.

I must by no means omit one branch of European surgery which has of late been practiced with great success by a Poonah artist, who has lately revived the Taliacotian art, differing only in the material; for he does not apply to the brawny parts of porters to restore the mutilated patient. I am not master of the process, but I am told it is by cutting the skin and muscles of the forehead on three sides, and drawing it over the deficient part (Pennant 1798).

In 1816, Joseph Carpue, an English surgeon who performed the Indian method in Chelsea, published *An Account of Two Successful Operations for Restoring a Lost Nose From the Integuments of the Forehead*. In this work, he states that the Indian method "offers so great an improvement on the Taliacotian practice." However, unlike Pennant,