Milestones of Asian Rhinoplasty

Abdulla Fakhro, MD¹ Ryan D. Wagner, MD¹ Yong Kyu Kim, MD² Anh H. Nguyen, MD¹

¹ Division of Plastic Surgery, Baylor College of Medicine, Houston, Texas

² Apgujung YK Plastic Surgery Clinic, Seoul, Korea

Address for correspondence Anh H. Nguyen, MD, Division of Plastic Surgery, Baylor College of Medicine, 1977 Butler Blvd, Suite E6.100, Houston, TX 77030 (e-mail: anhplasticsurgery@gmail.com).

Semin Plast Surg 2015;29:213–218.

Abstract

Keywords

- ▶ augmentation rhinoplasty
- ▶ Asian
- ▶ implant
- ▶ diced cartilage
- ▶ aesthetic surgery
- ▶ Oriental costal cartilage
- ▶ expanded polytetrafluoroethylene
- ▶ multilayer tip grafting
- ▶ extracorporeal septoplasty
- ▶ short nose

The field of plastic surgery originally developed out of the necessity to reconstruct the human body after the destruction of war. However, injured soldiers were not the only people who desired a change in appearance. After World War II, many people in Asian countries sought to attain a more Western look through surgery. Along with eyes, the nose was the main focus for these cosmetic procedures. In this article, the authors examine the evolution of Asian rhinoplasty from its original description in 1964 to the present. The characteristic anatomical differences between the Western and Asian nose are identified in relation to the technical challenges for rhinoplasty surgeons. Then the benefits and risks of the two major surgical approaches, autograft versus alloplast, are detailed. Finally, the coevolution of techniques and implant usage is traced from a dorsum-only implant, to an L-shaped implant, a cartilaginous cap graft with a one-piece rhinoplasty, an I-shaped implant, and a two-piece augmentation rhinoplasty. Outlining these changes demonstrates the advancement of the field of plastic surgery and the growing expectations of the patient. These advancements have provided the tools necessary to better align a patient's aesthetic goals and their unique anatomical presentation with a specific surgical approach.

The first documentation of reconstructive surgery dates back to 600 BC in India, with reconstruction of the nose defect with a forehead flap.^{1–3} However, it was not until the First World War that the field of plastic surgery, as practiced today, was widely recognized.^{1,4} The nature of combat in WWI dramatically altered injury presentation in comparison to previous wars. Soldiers were often positioned in trenches with their bodies shielded, but faces exposed. Few surgeons took on the surgical correction of these traumatic head and neck injuries as little was known or developed about the necessary reconstructive techniques and management.^{3,4} Widely regarded as the father of modern plastic surgery, Harold Gillies rose to the challenge. After volunteering with the Red Cross as a general surgeon and training with some of the most prominent European surgeons of the time, Gillies established the first facility dedicated to maxillofacial casualties at Cambridge Hospital in Aldershot, England.^{1,2} The novel presentation and severity of the injuries forced Gillies to push boundaries

and innovate with techniques such as the tubed pedicle flap and bone and cartilage grafts for nasal reconstruction.¹ It was out of this time of war and destruction that great strides were made and the field of plastic surgery was defined.

Unlike most surgeons who returned to private practice at the conclusion of the war, Gillies remained an advisor to the armed forces. However, in Europe, many still viewed plastic surgery as an unnecessary specialty.⁵ It was not until after the Second World War that plastic surgery achieved lasting recognition as a specialty. After serving in the Navy during WWII, Ralph Millard completed a preceptorship with Gillies that set the stage for their future collaboration. During the Korean War ceasefire, Millard traveled to South Korea as the Chief Plastic Surgeon for the U.S. Marine Corps to assist the Korean civilians in rehabilitation. There he was able to practice on a high volume of patients with far fewer restrictions than in the United States.^{1,4} Although his largest achievement was probably the advancement of cleft lip

Issue Theme Cosmetic Asian Rhinoplasty; Guest Editor, Anh H. Nguyen, MD

Copyright © 2015 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA.
Tel: +1(212) 584-4662.

DOI <http://dx.doi.org/10.1055/s-0035-1564821>.
ISSN 1535-2188.

repair, he also began to perform cosmetic surgery, specifically blepharoplasties and rhinoplasties, on Korean patients desiring a more Western appearance, starting with those that had access to the U.S. military base in South Korea.⁶

Westernization

Due to Western cultural influences and the presence of American forces in Asia, there was a fixation in many Asian circles in the 1950s, 1960s, and even into the 1970s with Western appearance in Japan, Korea, and elsewhere.^{6,7} Millard reported various reasons for his patients seeking to be “deorientalized” ranging from economic to religious. He detailed the case of a Korean interpreter who wanted an Occidental appearance to improve relations with the West. In a critical assessment of the results, the patient certainly had changes to his face. The patient looked less Korean, and even older, with more highlight and shadow to his midface and periorbital area. We only have a frontal view comparison, with the preoperative view in repose and the postoperative view in smiling animation. This smiling animation to some extent distorts our perception of the actual final appearance, and prevents a more objective, critical comparison with the unanimated preoperative look. Millard also noted that many Korean women considered the new operated look to be in vogue; certain women in postwar marriages desiring to fit in with their American GI husband or romantic liaison had embraced surgical change.⁶ This preference extended to other American military bases in Asia, such as Japan, the Philippines, and Vietnam. However, today many Asians both in and outside of Asia are more demanding, more educated, and more amenable to an improved, but integrated and proportional facial appearance.

It was in 1964 when the renowned Khoo Boo-Chai of Singapore first described the technical details of an Asian rhinoplasty.⁸ Although many Asian ethnicities stem from a common ancestry, they encompass a great diversity of nasal and facial appearances. Despite this diversity, some general distinctions can be made from the stereotypical Western or occidental nose.⁷ Typically, the Asian nose has thicker skin and more fibrofatty tissue, especially at the nasal tip. Combined with small and weak lower lateral cartilages, the tip generally has less projection and less-defined contours. Asians tend to have a more acute nasolabial angle due to columellar and premaxillary retraction. The alar base is broader with thickened alar lobules. The nasal dorsum and the radix are generally lower in height and the septal cartilage is thin and small.^{7,9–11} These disparities undoubtedly presented a new set of challenges for rhinoplasty surgeons and necessitated a different surgical approach than the standard reductive procedure for a Western rhinoplasty, applied since the time of Jacques Joseph. Since Boo-Chai’s publication, various approaches and techniques have been developed to augment the Asian dorsum primarily. Up until the past 15 years, an Asian rhinoplasty in Asia and in the United States could be summarized into two simple categories of procedures: (1) some type of simple dorsal augmentation, primarily with silicone implants, without much focus on the dorsal

angle from radix to tip; and (2) tip definition, which is meant to be alar base narrowing, mainly in the form of Weir alar reduction, and mistakenly thought to provide tip definition when it only narrows the alar base width, and in many unfortunate cases even contributes to a collapsed, pinched nasal tip appearance.

Contemporary Asian Rhinoplasty

The operated face had many incongruities: a radicalized looking radix sprouting straight out from the forehead, giving a lionized appearance to the face; a stiff-looking very narrow implant with tissue thinning; a pinched tip that does not have enough projection, but is upturned with piglike-nostrils showing. It was truly luck of the draw whether a patient’s anatomy and a simple implant-only augmentation would suffice for acceptable results. If the patient’s saddle nose was severe, with an excessively broad alar base, surgery resulted in at best a “stick-on-the-face” appearance. If the nose was short and nasal tip up-rotated, an aggressive implant procedure to lengthen the nose and derotate the tip led to disastrous results.

The focus on a Western appearance, once so sought-after, thus transitioned into a contemporary desire for a more natural Asian look. Many patients now request a procedure that would preserve their ethnic identity and facial congruity yet still meet their aesthetic goals of improved dorsal height and definition; with additional tip projection, angulation, and definition; and as equally important, if not more, an integrated nose in proportion to the rest of the face. Hence, surgeons began to inquire about each patient’s concept of cultural identity and his or her motivations for undergoing the procedure.^{7,12} With this understanding, the surgeon could better align a patient’s aesthetic goals with the surgical approach.

Contemporary cutting-edge Asian rhinoplasty procedures are centered on the triad of angulated dorsal augmentation with tip projection and definition rather than on nasal framework reduction. There is a focused interest in improving tip definition through tip sutures and grafts.¹³ Both autografts and alloplasts are now commonly employed in Asian rhinoplasty techniques.⁷ The specific use of one over the other is a matter of debate, leading to two individual—often controversial—schools of thought separated by geographical location.¹⁴ It is interesting to note that as of the time of this writing, finding a plastic surgeon in South Korea to contribute to this *Seminars in Plastic Surgery* issue who uses pure L-shaped silicone or L-shaped Gore-Tex implants in surgery of the Asian nose was a daunting task.

The ideal cartilage for nasal reconstruction in the Western literature remains septal cartilage.¹⁵ However, the Asian nose is often deficient in such cartilage. Southeast Asian surgeons prefer alloplastic augmentation, most notably silicone, over autograft.¹⁴ In Asia, many rhinoplasty surgeons have made the implant approach work to a significant degree after decades of experience. There have been adaptations in the use of implants that have allowed for a better long-term safety profile. Unfortunately, the risk of infection, displacement, extrusion, and capsular

contracture still accompany the use of these implants as with any other foreign material.^{7,8}

Western surgeons tend to favor autografts, with a near-negligible risk of crossover infection associated with the donor tissues. The common primary nasal anatomical need of the Caucasian nose is a minor dorsal augmentation, mainly for definition, and less for substantial augmentation. The other procedures that traditionally require grafts have been for columellar strut support and modest tip grafting, such as that used in the endonasal approach. However, autografts are not without their own set of complications, which include limited donor material, donor site morbidity, increased operative time, resorption, and warping.⁷ With the advent of open structure rhinoplasty, and even more so with the use of structural support in secondary rhinoplasties from collapsed noses, a greater quantity of graft was required. This is evidenced by the progression to more frequent rib cartilage use, as advocated by surgeons such as Gunter and Toriumi.¹⁶

Graft materials used in Asian rhinoplasty have varied over time with the development of novel techniques. The grafts were developed by surgeons with a concern for function alongside a keen eye for cosmesis and symmetry. Such graft materials included, but were not limited to paraffin, gold, silver, wood, acrylic, and ivory.^{14,17} However, silicone implants remain the most widely used alloplastic implants, yielding superior aesthetic results with ease of use, minimal operative time, and relatively low cost. In many countries, such as China, Vietnam, Singapore, Thailand, Malaysia, and Taiwan, implant rhinoplasty, and particularly silicone implant rhinoplasty, still remains the first and often only choice for Asian patients. On the other hand, in South Korea and Japan, a patient would be hard pressed to find an implant-only surgeon, particularly in large metropolitan areas such as Seoul, where patients are more demanding about their nasal appearance.

Khoo Boo-Chai's pivotal legacy technique for Asian rhinoplasty employed careful use of a fashioned "medical grade" silicone implant. Boo-Chai stressed the importance of both dorsal and nasal tip augmentation by dividing his technique into augmentation of the dorsum followed by an alarplasty. He also introduced the concept of the golden point, a point halfway between the orbital ridge and the intercanthal line, which is the ideal starting point for the end of a silicone implant on the nasal dorsum.⁸ If the implant went beyond this golden point, it would leave the patient with an "unnatural" nasal configuration.

New techniques and implants were introduced in the 1970s and 1980s as further publications emerged detailing the Asian nose. At this time, the majority of the Asian rhinoplasties were conducted using a closed technique, either through the nose or mouth. One of the new implants was the L-shaped silicone dorsal implant developed to provide dorsal height, added tip projection, and modest caudal septal extension, which was difficult to achieve with prior implants.¹⁸ The L-shaped silicone implant offered excellent columellar extension and provided volume where there had been little columellar show. However, over time the firm implants interacted with the soft nasal tissue resulting in unwanted outcomes at the nasal tip, including skin thinning with implant outlining, redness, tip deformation,

implant extrusion, and compression of the cartilaginous framework with resultant tip droop (►Fig. 1).^{19,20}

As the implants evolved, so too did rhinoplasty techniques.¹⁴ Autologous grafts, innovated and popularized in the West, were adopted for Asian patients. When Peck introduced the cap graft, it was quickly adapted to the tip of the L-shaped silicone implant, to minimize the chances of tip extrusion.²¹ The combined implant became known as a "one-piece rhinoplasty" (►Fig. 2).²²

Different types of shaped silicone nasal implants were introduced in the 1980s through the 1990s (►Fig. 3), which provided primarily for dorsal height augmentation and preservation of native tip projection without compromising its structure.²³ Similar to the cap graft added to the L-implant, a cap graft was added to the I-implant (►Fig. 4).

The successful use of auricular cartilage, and less commonly septal cartilage, then prompted the introduction of the "two-piece augmentation rhinoplasty." In this technique, the use of a straight silicone implant is limited to the dorsum only. The columella is supported and/or projected and the tip is augmented with autologous cartilage (►Fig. 5).¹⁵

With Byrd's septal extension graft innovation, sturdier and more predictable support of the nose was achieved. This technique quickly became popularized in the mid-2000s (►Fig. 6).²⁴ From the mid-2000s to 2010, septal harvest for a multitude of graft uses resulted in many patients in Seoul, South Korea, lacking adequate septal cartilage for a redo rhinoplasty. In response, many Asian rhinoplasty surgeons have chosen one of two routes. Some use irradiated septal cartilage for septal extension grafts and/or columella struts and/or spreader grafts, which provide a satisfactory appearance in the short term. There is certainly no need for septal harvest or usage of other donor body sites with resultant scarring. However, these irradiated cartilage grafts have a questionable enduring presence long term.²⁵ In South Korea in the mid to late 2000s, many surgeons extensively used irradiated cartilage grafts. Irradiated cartilage can be easily broken, infected, and can be resorbed. If used for structural support, there is concern with what happens to the nasal

Fig. 1 The L-shaped nasal implant used well into the 1970s.

Fig. 2 (A) The “cap graft” minimized the potential L-shaped implant extrusion at the tip. (B) Diagram of a one-piece rhinoplasty with a cap graft.

framework as the cartilage gets resorbed over time. Now, much fewer clinics in Seoul are proponents of their routine use. Others have adopted Toriumi’s¹³ use of autogenous rib graft for extensive support of the secondary nose. With this material, autogenous cartilage quantity and quality were both in abundance for multiple graft types of the dorsum, tip-columellar complex, and alar wings. Rib soon became a reliable material for use in many cases of primary Asian rhinoplasty, in intact or diced cartilage form (–Fig. 7).¹⁸

Fig. 3 Various alloplastic shaped implants used for nasal augmentation.

Conclusion

Owing to various anatomical differences, it is not surprising that Asian noses mandate variable augmentation techniques of the nasal tip and dorsum compared with their Caucasian counterparts. Autologous septal grafts often fall short of delivering sufficient amounts of cartilage to augment the Asian nose. Ear cartilage may not have adequate stability for strong support. Rib cartilage harvests are not without their risk. Social Asian cultures favor inconspicuous scar placement, with a fear of hypertrophic or keloid scarring potentially from rib harvest. In addition, many surgeons, particularly of the older generations, are not familiar with

Fig. 4 Cap graft to L-shaped implants, and then I-shaped implants with a cap graft a decade later.

Fig. 5 Two-piece structural augmentation rhinoplasty.

2000 --

Fig. 6 Septal extension graft used in the 21st century.

Fig. 7 The evolution of Asian rhinoplasty over time.

rib harvesting, handling, and shaping, with a resultant potential increased risk of pneumothorax, visibility, irregularity, and/or warping. The evolution of the Asian augmentation rhinoplasty with current alloplastic silicone implants to the dorsum and autologous tip support and shaping has also yielded good results with acceptable early complication rates. Of course, the above approaches focus only on the dorsum and the midline tip. Likely the next stage in the evolution of Asian rhinoplasty will be more focused attention on lower alar

support and shaping, which will yield good tip definition, mostly through cartilage grafts.

References

- 1 Chambers JA, Ray PD. Achieving growth and excellence in medicine: the case history of armed conflict and modern reconstructive surgery. *Ann Plast Surg* 2009;63(5):473–478

- 2 Shastri-Hurst N. Sir Harold Gillies CBE, FRCS: the father of modern plastic surgery. *Trauma* 2012;14(2):179–187
- 3 Backstein R, Hinek A. War and medicine: the origins of plastic surgery. *Univ Toronto Med J* 2005;82(3):217–219
- 4 Hallock GG. The plastic surgeon of the 20th century. *Plast Reconstr Surg* 2001;107(4):1014–1024
- 5 Bamji A. Sir Harold Gillies: surgical pioneer. *Trauma* 2006;8(3):143–156
- 6 Millard DR Jr. Oriental peregrinations. *Plast Reconstr Surg* (1946) 1955;16(5):319–336
- 7 Ishii CH. Current update in Asian rhinoplasty. *Plast Reconstr Surg Glob Open* 2014;2(4):e133
- 8 Khoo BC. Augmentation rhinoplasty in the Orientals. *Plast Reconstr Surg* 1964;34:81–88
- 9 Jang YJ, Yi JS. Perspectives in Asian rhinoplasty. *Facial Plast Surg* 2014;30(2):123–130
- 10 Toriumi DM, Swartout B. Asian rhinoplasty. *Facial Plast Surg Clin North Am* 2007;15(3):293–307
- 11 Wu WT. The Oriental nose: an anatomical basis for surgery. *Ann Acad Med Singapore* 1992;21(2):176–189
- 12 Lam SM. Asian rhinoplasty. *Semin Plast Surg* 2009;23(3):215–222
- 13 Toriumi DM, Pero CD. Asian rhinoplasty. *Clin Plast Surg* 2010;37(2):335–352
- 14 McCurdy J, Lam S. *Asian Cosmetic Facial Surgery*. 2nd ed. New York: Thieme Medical Publishers; 2005
- 15 Baker S, Naficy S. *Principles of Nasal Reconstruction*. 1st ed. New York: Mosby; 2002
- 16 Toriumi DM, Josen J, Weinberger M, Tardy ME Jr. Use of alar batten grafts for correction of nasal valve collapse. *Arch Otolaryngol Head Neck Surg* 1997;123(8):802–808
- 17 Araco A, Gravante G, Araco F, et al. Autologous cartilage graft rhinoplasties. *Aesthetic Plast Surg* 2006;30(2):169–174
- 18 Bergeron L, Chen PK-T. Asian rhinoplasty techniques. *Semin Plast Surg* 2009;23(1):16–21
- 19 Ahn J, Honrado C, Horn C. Combined silicone and cartilage implants: augmentation rhinoplasty in Asian patients. *Arch Facial Plast Surg* 2004;6(2):120–123
- 20 Mutou Y. The complications of augmentation rhinoplasty in Orientals. *Br J Plast Surg* 1975;28(3):160–163
- 21 Flowers R. Rhinoplasty in Oriental patients: repair of the East Asian nose. In: *Aesthetic Plastic Surgery: Rhinoplasty*. Boston: Little, Brown and Company; 1993
- 22 Matsunaga R. Augmentation rhinoplasty of Asian noses. *Facial Plast Surg Clin North Am* 1996;4:75–85
- 23 Chuangsuwanich A, Lohsiriwat V. Augmentation rhinoplasty with custom-made S-shape silicone implant in Asians: A 15-year experience. *Indian J Plast Surg* 2013;46(3):533–537
- 24 Ha RY, Byrd HS. Septal extension grafts revisited: 6-year experience in controlling nasal tip projection and shape. *Plast Reconstr Surg* 2003;112(7):1929–1935
- 25 Suh MK, Ahn ES, Kim HR, Dhong ES. A 2-year follow-up of irradiated homologous costal cartilage used as a septal extension graft for the correction of contracted nose in Asians. *Ann Plast Surg* 2013;71(1):45–49