

Original Article

A modified technique for nipple-areola complex reconstruction

Shoeib A. Mohamed, Peir Camillo Parodi¹

Department of Plastic Surgery, Sohag University, Egypt, ¹Udine University, Italy

Address for correspondence: Dr. Mohamed Shoeib, Department of Plastic Surgery, Sohag University, Egypt. E-mail: mrahmoni@yahoo.com

ABSTRACT

Background: From a historical perspective, many techniques of nipple reconstruction have been performed, including a graft from the contralateral nipple, composite grafts such as toe pulp or earlobe tissue and even an intra-dermal tattoo alone. This is the final stage of breast reconstruction, and is carried out only when the surgeon is confident that acceptable symmetry and shape of the reconstructed breast has been achieved. The technical challenges of nipple reconstruction include correcting position, maintaining adequate projection and creating an inconspicuous scar. An alternative to a surgically reconstructed nipple is the use of silicone prosthetic nipples. **Materials and Methods:** From August 2006 until September 2007, 80 cases of nipple/areola reconstruction were performed in our department (UDINE UNIV.) following mammary reconstruction or conservative breast surgery. Forty cases were carried out with the classical technique and another 40 cases with the introduction of our modification in the form of deepithelization of a semicircular area of the adjacent skin at the base of the flap. Postoperative follow-up as regards the nipple size, site, projection, symmetry and donor scar were assessed. Patient satisfaction was also addressed and evaluated. **Results:** There were good to excellent results as regards nipple size, symmetry and projection. The technique is suitable for different autologous and implant reconstruction. The technique is an outpatient procedure, is easy and is not consuming time. Areolar graft from the contra-lateral areola is colour matching and shows nearly no deference from the opposite one. **Conclusions:** Simple technique and not time consuming. Maintains the consistency and projection of the new nipple. Patient satisfaction. Minimal complication.

KEY WORDS

Areola; breast; nipple; reconstruction

INTRODUCTION

Reconstruction of the nipple-areola complex has been

shown to have a positive influence on the overall recovery process of women undergoing postmastectomy breast re-construction.^[1,2] From a historical perspective, many techniques of nipple reconstruction have been performed, including a graft from the contra-lateral nipple, composite grafts such as toe pulp or earlobe tissue, local flaps and even an intra-dermal tattoo alone.^[3,4] An alternative to a surgically reconstructed nipple is the use of silicone prosthetic nipples.^[5,6] Common to virtually all of these techniques is a postoperative loss of volume that occurs in the reconstructed nipple.^[2]

| Access this article online | |
|---|---------------------------------|
| Quick Response Code: | Website: www.ijps.org |
|  | DOI: 10.4103/0970-0358.81450 |

Nipple areola reconstruction is the final stage of breast reconstruction, and should be carried out only when the surgeon is confident that acceptable symmetry and shape of the reconstructed breast has been achieved. The technical challenges of nipple reconstruction include correcting position, maintaining adequate projection and creating an inconspicuous scar.

The problem of all these techniques is a postoperative loss of volume that occurs in the reconstructed nipple. For this reason, many authors have advised creating a nipple that is up to twice the size ultimately desired to take into account this expected loss of volume.^[7,8]

In techniques involving the use of local flaps from the apex of the reconstructed breast mound, transposing flaps to reconstruct such large nipples can create a sizable defect in the skin envelope of the reconstructed breast. Attempts to close these donor sites directly can constrict the shape of the breast and therefore detract from the overall result.^[9]

Over the past 20 years, the state of the art for nipple reconstruction has been the use of a local skin flap that is elevated at the ideal site of the intended nipple or pulled out of the contour of the breast and assembled as a projecting tissue mound. These “pull-out” flaps are derivatives of the skate design.^[5,6,10]

In an attempt to devise a technique for reconstruction of the nipple-areola complex that would provide for a nipple of adequate bulk and long-term projection, deepithelization of a semi-lunar part of the adjacent skin central to the flap was developed. This design provides the long-term projection and decreases the cicatertial resorption of the nipple volume thus preserving its long-term volume.

MATERIALS AND METHODS

From August 2006 until September 2007, 80 cases of nipple/areola reconstruction were performed following mammary reconstruction or conservative breast surgery, 40 with the CV of Hartrampf (classical) technique and 40 with the introduction of our modification.

The patients were having either post mastectomy breast reconstruction by autologous tissue or implants or were those following conservative breast surgery. All the procedures were done secondarily after 3–6 months of breast reconstruction. Sometimes, the nipple-areola

reconstruction was performed at the time of symmetrization operation for the contra-lateral breast; at that time, the areolar skin could be used for grafting of the new areola.

Forty cases were performed as the usual CV of Hartrampf without modification, and another 40 cases with the introduction of the modification. Follow-up of both groups was performed at 3, 6 and 12 months postoperatively to document the size, projection and symmetry and comparison with the opposite side.

The patient herself assessed the results, and each patient could choose three possible indices of satisfaction: bad, good and excellent. Another assessment performed by measuring the decrease in the nipple projection in millimeters at 3, 6 and 12 months, respectively. The decrease in nipple projection was divided into three categories: <1 mm, 1–2 mm and >2 mm in our study.

Surgical technique

From our experience and those from other centres, the most simple and versatile technique for reconstruction is the local CV of Hartrampf technique, which was the classical technique performed. The contra-lateral nipple is used for determining the new nipple position. The CV flap technique involves raising two V-shaped flaps of the skin in continuity with a C-shaped, subcutaneous flap, and then rearranging them to create the new nipple.

The flap is designed to produce a nipple 1.5 to 2 times the size of the opposite normal nipple in anticipation of the postoperative cicatertial resorption of the nipple flap.

The classical technique

The flap is elevated as shown in Figure 1 and the donor is closed primary. There is a narrow base of the new nipple beside downward inclination of the nipple due to deficient support of its base.

Modification

That is why we modify the technique as shown in Figure 2, in the form of deepithelization of a semicircular area of the adjacent skin. This deepithelized area of skin gives a good support to the base of the new nipple and guards against the narrow base and provides a good platform to the nipple enhancing maintenance of its projection as in Figure 3. Closure of the flap is performed as usual.

The areola is reconstructed either by a split skin graft or from



Figure 1: (a) The classical CV flap technique, (b) The classical technique



Figure 1c: The classical technique

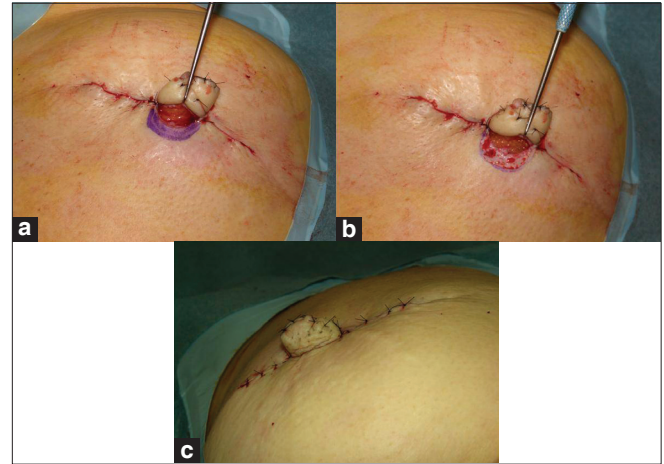


Figure 2: (a) Modified technique, (b) Modified technique, (c) Modified technique



Figure 3: (a-b) Follow-up at 4 months

the contra-lateral areolar graft if it was performed during the symmetrization of the opposite breast as shown in Figure 4. The inset of the graft is carried out after deepithelization of a semicircular area at the base either of the nipple if it was a split-thickness graft or from the contra-lateral areola in the modified group of patients.

A soft plastic splint is used for supporting the new nipple. This noncompressing protective appliance is needed for 3 months postoperatively. Meticulous massaging by use of local cortisone is advised.

RESULTS

Both the techniques were performed under local anesthesia. In both the groups the new nipple areola was assessed in terms of the size, projection, nipple circumference, invagination and symmetry in relation to the opposite normal side. In addition, the patient's self-satisfaction was evaluated by scoring as excellent, good and poor in both the groups.

The decrease in the neonipple projection in millimeters was measured in both groups. This decrease was divided into three categories: <1 mm, 1–2 mm and >2 mm. In the modified technique group, 12 cases were <1 mm decrease in the projection while 18 cases were 1–2 mm and 10 cases were >2 mm decrease in the nipple projection, while in the classical technique group the figures were 4, 14 and 22 cases, respectively. This denotes the difference between the two groups in terms of degree of nipple projection, with a significant *P*-value as shown in Figure 5-6, Table 1.

Patient self-satisfaction was scored to be poor, good and

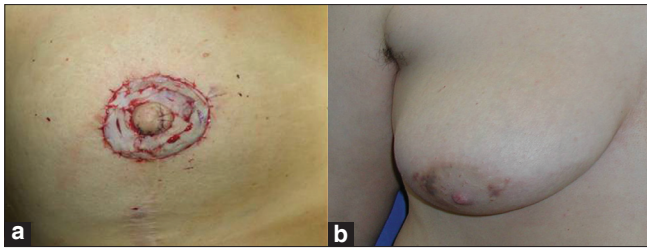


Figure 4: (a-b) Areolar graft from the opposite breast

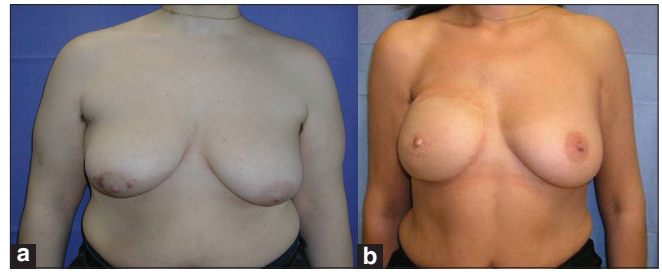


Figure 7: (a-b) Late postoperative



Figure 8: With the bra

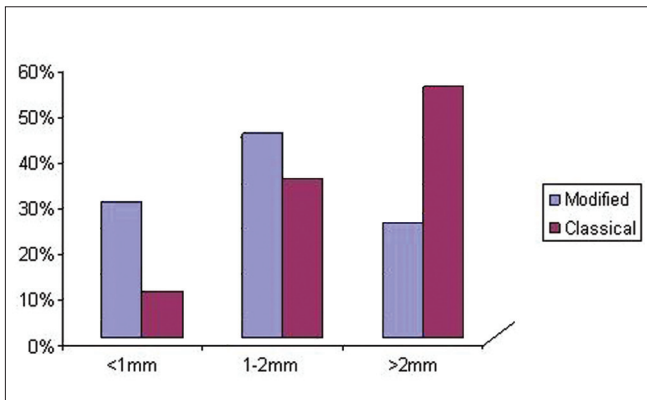


Figure 5: Comparison of the two groups as regards nipple projection

excellent in the two groups as shown in Figure 6. In the modified technique group, two cases were bad, 13 cases were good and 19 cases were excellent while in the other group, 12 cases were bad, 17 cases were good and 11 cases were excellent. This clearly demonstrates the difference between the two groups and indicates the advantages of the modification towards a better overall outcome as seen in Figure 7 and 8.

DISCUSSION

Nipple reconstruction is an important part of breast reconstruction.^[1] We share the opinion of others that creation of the nipple transforms the reconstructed breast mound into a breast.^[10-13] Several nipple reconstruction techniques that use grafts or flaps have been reported.^[1-14] They give comparable and satisfactory short-term results, but these worsen over time, with a loss of projection, invagination and a relative widening of the base. It should

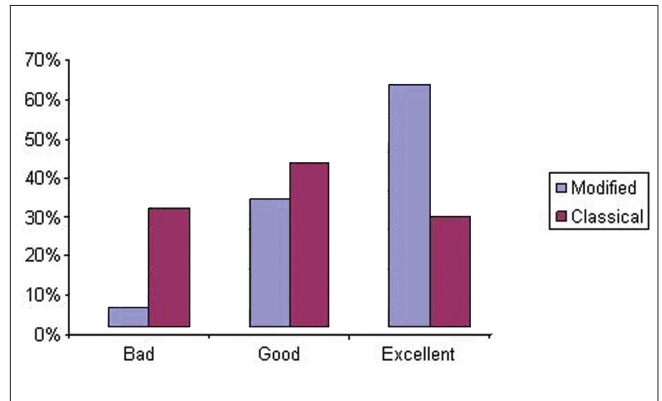


Figure 6: Patient's self-satisfaction in both groups

Table 1: Paired sample correlations comparing the two techniques

| | N | Correlation | Sig. |
|----------------------|---|-------------|-------|
| Nipple reduction | 2 | 1.000 | 0.000 |
| Patient satisfaction | 2 | -1.000 | 0.000 |

be noted that retraction of the skin, dermis and fat forming the nipple still occurs, and some loss of nipple projection must be anticipated.^[2]

The optimal technique of nipple reconstruction must be simple, reliable and produce nipples that show stable projection. This requires a very stable platform on which the nipple should rest and this we have created by the deepithelized semicircular part of the adjacent skin. The goal of our technique was to minimize this nipple height loss by ensuring a stable base. The semicircular area of deepithelialized skin in the central portion provides this platform. Projection loss caused by scar contraction in this area is therefore limited due to the stable platform on which the nipple base rests.

Deepithelialization of the supportive base seems to be a significant factor for long-term stability of results and, in addition, prevents a secondary invagination again because of this stable base below the neo-nipple. So we can conclude with reasonable certainty that a stable base is necessary

for the flap projection and a simple deepithelialization is reliable, and ensures flap support without any risk of secondary invagination [Figure 5].

The choice to carry out a flap with a height 1.5 to 2-times that of the natural nipple was judicious because, after a time gap, the neo-nipple was identical in height to the normal nipple.

The geometric principles of this flap make it easy to perform. The technique allows orienting the flap pedicle in any direction, depending on the available tissues.

Several authors have stressed that, after surgery, care is essential.^[10-12] A bandage should not compress the neo-nipple because this contributes to its secondary height loss. A soft plastic splint ensures a provisional protection of the nipple for approximately 3 months postoperatively.

The most common point of dissatisfaction with nipple-areola reconstruction has been shown to be the lack of long-term nipple projection, followed in descending order by colour mismatch, unattractive shape, size and texture and, finally, nipple malposition.^[15]

In our series, there have been no cases of nipple flap loss. Overall, the aesthetic appearance of these reconstructed nipples has been highly satisfactory in the group of modified technique compared with the classical one [Figure 6].

The modified technique is easy to apply to most of the nipple flaps, with a minimum of extra time and effort applying basic plastic and reconstructive surgical principles.

REFERENCES

1. Shestak KC, Gabriel A, Landecker A, Peters S, Shestak A, Kim J. Assessment of long-term nipple projection: A comparison of

- three techniques. *Plast Reconstr Surg* 2002;110:780-6.
2. Bhaty MA, Berry RB. Nipple-areola reconstruction by tattooing and nipple sharing. *Br J Plast Surg* 1997;50:331-4.
3. Tanabe HY, Tai Y, Kiyokawa K, Yamauchi T. Nipple-areola reconstruction with a dermal-fat flap and rolled auricular cartilage. *Plast Reconstr Surg* 1997;100:431-8.
4. Banducci DR, Le TK, Hughes KC. Long-term follow-up of a modified Anton-Hartrampf nipple reconstruction. *Ann Plast Surg* 1999;43:467-9.
5. Wellisch DK, Schain WS, Noone RB, Little JW 3rd. The psychological contribution of nipple addition in breast reconstruction. *Plast Reconstr Surg* 1987;80:699-704.
6. Wong RK, Feldman S, Banducci DR. A modification of the Anton-Hartrampf star flap using pre-reconstruction tattooing. *Perspect Plast Surg* 1993;7:137.
7. Little JW. Nipple-areolar reconstruction. In: Spear SL, editor. *Surgery of the Breast: Principles and Art*. Philadelphia: Lippincott-Raven Publisher; 1998.
8. Kroll SS. Nipple reconstruction with the double opposing flap. *Plast Reconstr Surg* 1999;104:511-4.
9. Eskenazi L. A one-stage nipple reconstruction with the "modified star" flap and immediate tattoo: A review of 100 cases. *Plast Reconstr Surg* 1996;92:671-80.
10. Kroll SS, Reece GP, Miller MJ, Evans GR, Robb GL, Baldwin BJ, et al. Comparison of nipple projection with the modified double-opposing tab and star flaps. *Plast Reconstr Surg* 1997;99:1602-5.
11. Losken A, Mackay GJ, Bostwick J 3rd. Nipple reconstruction using the C-V flap technique: A long-term evaluation. *Plast Reconstr Surg* 2001;108:361-9.
12. Little JW. Nipple-areolar reconstruction. In: Cohen M, editor. *Mastery of Plastic and Reconstructive Surgery*. Vol 2. Boston: Little, Brown; 1994. Wellisch DK, Schain WS, Noone R. B, Little JW 3rd. The psychological contribution of nipple addition in breast reconstruction. *Plast Reconstr Surg* 1987;80:699-704.
13. Few JW, Marcus JR, Casas LA, Aitken ME, Redding J. Long-term predictable nipple projection following reconstruction. *Plast Reconstr Surg* 1999;104:1321-4.
14. abor MA, Shayani P, Collins DR Jr, Karas T, Cohen BE. Nipple-areolar reconstruction: satisfaction and clinical determinants. *Plas Reconstr Surg* 2002;110:457-63.
15. Hammond DC, Khuthaila D, Kim J. The skate flap purse-string technique for nipple-areola complex reconstruction. *Plast Reconstr Surg* 2007;120:399-406.

Source of Support: Nil, **Conflict of Interest:** None declared.