



Free Nipple Graft Technique to Correct Nipple and Areola Malposition after Breast Procedures

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Summary: Secondary correction of nipple areola complex (NAC) malposition represents a major concern after breast reconstructive procedures. It is frequently requested by patients complaining about asymmetric areolas impairing the whole reconstructive procedure and asking for improved cosmetic outcomes. Several methods have been described to achieve a good symmetry between the 2 areolas, either natural or reconstructed. We describe our correction technique with free NAC graft. A total of 16 patients were treated with free NAC grafts between April 2010 and April 2013 at the European Institute of Oncology, Milan, Italy. This series focused on the surgical technique and its postoperative outcomes. Three cases of partial graft loss (18%) were observed in the postoperative period. No total NAC necrosis occurred. No infection was observed. All the complications were managed with a conservative treatment, not requiring any further surgery. NAC malposition following breast reconstructive procedures can be corrected using the technique of free NAC graft with reliable and satisfactory results. (*Plast Reconstr Surg Glob Open* 2013;1:e69; doi: 10.1097/GOX.0000000000000002; Published online 14 November 2013.)

Nipple and areola complex (NAC) malposition can occur after several breast reconstructive procedures. After breast conserving surgery (BCS) for cancer treatment, it can occur if large volumes of breast tissue are removed and the breast parenchyma is displaced to correct the partial defect. Similarly, in case of volume replacement techniques using local flaps (fasciocutaneous, glandular, and muscular flaps) to correct partial breast defects, the flaps themselves can negatively influence the nipple

and areola position, especially if not well planned. Postoperative irradiation after breast conserving treatment can exacerbate NAC malposition. After nipple and areola sparing mastectomy (NSM), the radial mastectomy scar at the superior-external quadrant can dislocate the spared NAC superiorly and/or laterally. Similarly, any breast scar and its physiologic retraction can impair NAC position if the muscular and skin envelope acts separately and independently in implant-based reconstructions. The correction of NAC malposition is frequently requested by patients complaining about asymmetric areolas impairing the whole reconstructive procedure and asking for improved cosmetic outcomes.

The management of malpositioned NAC is challenging. Several surgical techniques have been described including NAC transposition on a pedicle,^{1,2} lowering of NAC with implants,^{3,4} skin expansion, and elevation of the inframammary fold with breast parenchyma. Free nipple grafts have been reported for huge reduction mammoplasties.⁵⁻⁹ Spear

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and Hoffman¹⁰ corrected NAC displacement following NSM by using the reciprocal transposition flaps. Frenkiel et al¹¹ reported a case of successful correction of a high-riding nipple using a Z-plasty technique. Therefore, currently there is no generally accepted surgical technique for managing NAC malposition. Each method can be suitable in specific and selected cases according to the local situation and the causes leading to NAC displacement. We present an alternative surgical approach to relocate the NAC using free NAC grafts combined with fat grafting. It allows restored symmetry between both NACs in terms of contour, size, and site.

PATIENTS AND METHODS

Between April 2010 and April 2013, 16 patients with NAC malposition after NSM or BCS underwent a free nipple graft procedure combined with fat grafting. Patients' age, weight, height, body mass index, smoking history, prior operative procedures, and associated comorbidities (diabetes mellitus, hypertension, and dyslipidemia) were recorded in our database as *patient characteristics*. Degree of nipple displacement, degree of ptosis, and sternal notch to nipple distance were recorded as *morphological characteristics*. *Surgical characteristics* including corrective surgical plan, type of reconstruction, duration of surgery, and cosmetic outcomes were also recorded. Patients included in the series showed NACs displaced superiorly and/or laterally to the correct ideal location. The malposition was quite obvious on both lateral and frontal views when compared with the contralateral side (Fig. 1). A photographic evaluation of the patients was performed up to 12 months postoperatively.

Preoperative Evaluation and Surgical Planning

All patients underwent a physical examination preoperatively and postoperatively. The midsternal and midclavicular lines were marked before surgery and the inframammary folds with the patient in the standing position. These anatomical landmarks help the surgeon to define the ideal NAC position. The area of parenchymal defect to be corrected with fat grafting and the new NAC location were marked on the breast. The new position of NAC was planned between 21 and 23 cm from the sternal notch, being approximately at the same level of the contralateral NAC with the patient standing with abducted arms (Fig. 1).

Operative Technique

With the patient standing, the new NAC area was marked corresponding to the size of the existing NAC. The NAC was harvested as a full-thickness graft with a scalpel at the level of the subdermis, preserving

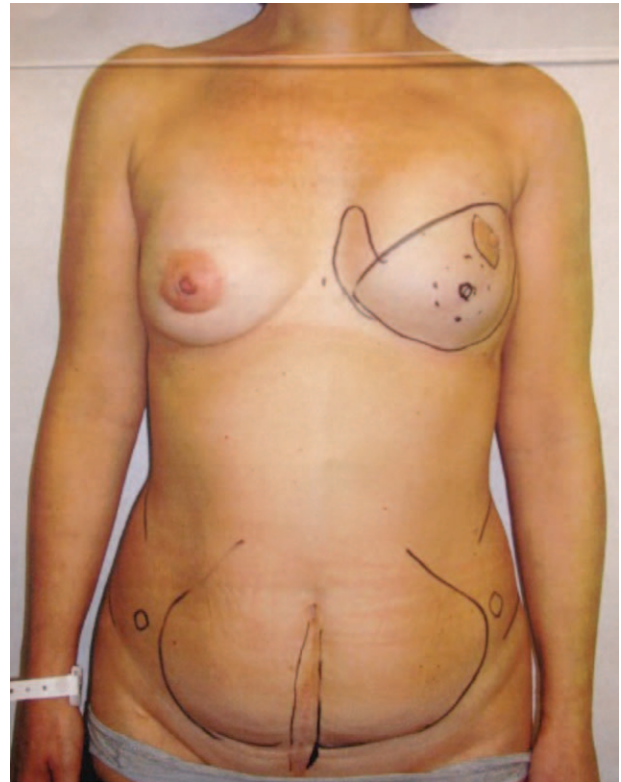


Fig. 1. Preoperative view of the patient.

the complete thickness of the dermis layer and trimming all subcutaneous tissues. The graft was then preserved in saline solution for later use (Fig. 2). The recipient NAC area was carefully deepithelialized with a number-10 blade. The patient was moved to a seated position and the new determined NAC location was checked. The graft was then placed on the deepithelialized bed at the recipient site and fixed with interrupted subcuticular 4-0 monocryl stitches



Fig. 2. The NAC graft is removed and saved.



Fig. 3. The NAC was placed in the deepithelialized bed and fixed with interrupted suture and correction of parenchyma defect with lipofilling technique.

(Fig. 3). Horizontal mattress sutures are used. A tie-over dressing gauze was applied on NAC graft and was secured circumferentially with 4-0 nylon to maintain the graft in place. An alternative syringe stent-assisted bolus tie-over dressing method to secure NAC grafts has been reported by Emekli et al.¹²

The fat grafting procedure was performed according to the Coleman's technique¹³ after grafting. The fat graft was injected into the defect area through a blunt Coleman's cannula. We estimated the amount of fatty tissue injected in each individual case, based on shape and size of the defect. The patients were followed at the outpatients department and the free nipple graft was examined on postoperative days 5 to 7 (Fig. 4).

RESULTS

All the patients included in this series previously underwent at least one breast procedure, being the most common primary procedure NSM with immediate reconstruction. Thorek reduction technique was performed in 2 cases. As shown in Table 1, the mean age at corrective surgery was 52 years (range, 37–72) and the mean body mass index was 24.2 kg/m². The mean surgical time was 97 minutes and none of the patients required reoperation. Partial necrosis of NAC was observed in 3 out of 16 cases (18%), resulting in superficial eschar on the nipple. Complete NAC necrosis was not observed in this series. Necrotic complications were managed by conservative dressing of the NAC and followed by spontaneous healing in all cases. No infection was observed.

DISCUSSION

Abnormally high located NACs after reduction mammoplasties or breast cancer procedures



Fig. 4. Early postoperative days 5 to 7. The areola shows signs of vascularization, and a superficial eschar on the nipple was seen as a sign of partial NAC necrosis.

represent a devastating problem with few surgical solutions. Several studies demonstrated the value and efficacy of free nipple transplantation in reduction mammoplasty.^{6–8,14} On the contrary, few reports in the literature described free NAC graft to correct NAC malposition.^{10,15} Our results demonstrate that NAC graft is a simple and reliable technique to correct NAC malposition after previous breast procedures, even in those patients who previously underwent locoregional radiotherapy that could negatively affect wound healing and graft intake. We combined fat grafting in our series to achieve and maintain breast fullness and symmetry. We believe that this combined procedure has the great advantage over other techniques of long-lasting results.

Tricky technical points of our technique include a careful and precise dissection of the NAC to ensure that all subcutaneous tissue has been trimmed, not thinning too much the graft, otherwise nipple projection and erectility will be severely impaired or completely absent.⁵ Horizontal mattress sutures of the graft into the recipient deepithelialized bed is another key point. A meticulous preparation of the graft and recipient bed and an adequate postoperative immobilization of the graft should minimize the risk of graft failure. In fact, an insufficient tie-over dressing with decreased contact between the graft and the recipient bed can lead to partial to total

Table 1. Comparison of Characteristics and Outcomes between Patients

No.	Age	BMI (kg/m ²)	Comorbidity	Smoker	Operative Technique	Previous Procedure	Result
1	52	26	None	No	Bilateral NAC graft with lipofilling	Bilateral NSM with whole breast radiation	Good
2	51	23.5	None	No	NAC graft with lipofilling	NSM with NAC irradiation	Good
3	56	34.8	HT	Yes	Thorek reduction technique	None	Good
4	72	23.2	None	Yes	NAC graft	NSM with NAC irradiation	Good
5	44	22.4	None	No	NAC graft with lipofilling	NSM with NAC irradiation	Good
6	49	20.3	None	Yes	NAC graft	BCS with whole breast radiation	Partial NAC necrosis
7	50	19.6	None	No	NAC graft with lipofilling	NSM with NAC irradiation	Good
8	53	21.8	None	Yes	NAC graft with lipofilling	NSM with NAC irradiation	Good
9	55	23.1	HT	No	NAC graft with lipofilling	BCS with whole breast irradiation	Good
10	50	27.3	HT	No	NAC graft	NSM with whole breast radiation	Good
11	45	27.6	None	Yes	Thorek reduction technique	None	Partial NAC necrosis
12	63	34.2	DM, HT, dyslipidemia	No	NAC graft	BCS with whole breast radiation	Good
13	48	19.9	None	Yes	NAC graft with lipofilling	NSM with NAC irradiation	Good
14	53	23.6	None	Yes	NAC graft	NSM with NAC irradiation	Good
15	37	20.7	None	No	NAC graft with lipofilling	BCS with whole breast radiation	Good
16	47	18.4	None	Yes	NAC graft with lipofilling	BCS with whole breast radiation	Partial NAC necrosis

BMI, body mass index; DM, diabetes mellitus; HT, hypertension.

Table 2. Comparison of Different Techniques and Outcomes

Author	Year	No. Cases	Preoperative Diagnosis	Operative Technique	Complication
Ali et al ¹⁵	1997	1	Malposition of reconstructed NAC after NSM with a pedicled LD flap	Rotating the figure 8 shaped NAC graft	None
Spear and Hoffman ¹⁰	1998	2	Displaced NAC after NSM with implant, augmentation with infection	Reciprocal full-thickness skin grafts	None
Mohmand and Naasan ¹	2002	1	Distortion NAC after burn	Double U-Plasty	None
Colwell et al ⁴	2007	3	High position of nipples after reduction, augmentation/mastopexy	Infraclavicular subcutaneous tissue expansion	None
Frenkiel et al ¹¹	2010	1	High-riding nipple after NSM with implant and WBR	Z-plasty transposition	None
Takayanagi ¹⁹	2010	2	Malpositioned nipple after NSM	Two subcutaneous pedicles and the purse-string suture	None
Taneda and Sakai ¹⁸	2011	1	Malpositioned nipple after NSM	Rotation flap and an advancement flap	None
Staley and Serra ¹⁶	2012	1	Malpositioned nipple after wide local excision	Transposition flap and skin graft	None
Spear et al ¹⁷	2013	4	High-riding nipple after NSM with implant and WBR, mastopexy	Reciprocal transposition flap	Transient flap ischemia 1 case

LD, latissimus dorsi; WBR, whole breast radiation.

graft loss. The main disadvantages of this procedure are the resulting scar at the donor area and the pigmentation of the NAC after grafting. Depigmentation can be corrected with tattooing.

Limitations of our study include the small sample size and a single surgeon experience. Although several techniques to successfully move the NAC to a more appropriate location have been described in the literature (Table 2), however, the present

series is the largest for this specific type of surgery. Further comparative studies with larger sample sizes are required.

CONCLUSIONS

In conclusion, a simple and effective technique of the free nipple and areola graft is presented in combination with fat grafting. This combined procedure allows the simultaneous correction of a malpositioned

NAC and parenchyma defects after BCS or NSM in breast cancer patients.

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