

The Free-Nipple Breast-Reduction Technique Performed with Transfer of the Nipple–Areola Complex Over the Superior or Superomedial Pedicles

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Abstract

Background Although the free-nipple breast-reduction technique is essentially an amputation, achieving aesthetic results still is important. The authors present their technique for free nipple–areola complex (NAC) transfer over the superomedial or superior pedicle full-thickness flaps in patients for whom a free-nipple technique is inevitable due to certain risk factors.

Methods The study included 25 patients who underwent surgery with the aforementioned method for addressing severe gigantomastia. The patients had a mean age of 43 years (range 34–59 years) and a mean body mass index (BMI) of 35.8 kg/m² (range 28–42 kg/m²). During the operation, the NAC was elevated as a full-thickness skin graft, then transposed to the superior or superomedial pedicles, which had been planned previously. The subsequent stages of the operation thus became a Wise-pattern breast reduction.

Results The mean resection per breast was 1,815 g (range 1,620–2,410 g). Breast projection, shape, and areolar pigmentation were assessed during the follow-up visit. One patient experienced a partial loss of the NAC graft, which healed secondarily, and three patients experienced a patchy hypopigmentation of the NAC. Breast projection and conical structure were observed to be preserved during the follow-up period.

Conclusions The modified free-nipple technique aimed to convert the reduction procedure to a technique similar to pedicle methods, yielding successful results during the early phases. The full-thickness flap constructed in this way provides more fullness and a maximum contribution to projection in patients who will inevitably undergo breast reduction with the free-nipple method.

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Introduction

Numerous techniques for breast reduction have been developed, all with certain advantages and disadvantages [1–6]. Although many alternatives exist for patients with moderate breast hypertrophy, surgical options for patients with massive breast hypertrophy or severe ptosis are more limited.

For patients with severe gigantomastia, breast amputation with a free-nipple-graft application is a useful and a

Table 1 Characteristics of the 25 patients

<i>n</i> = 25 (number of patients)	Mean	Range
Age (years)	43	(34–59)
BMI (kg/m ²)	35.8	(28–42)
Follow-up (months)	19.2	(17–25)
Suprasternal notch–nipple distance (cm)		
Right	38.7	(33–40)
Left	38.8	(34–45)
Nipple–inframammary sulcus distance (cm)		
Right	17.4	(15–21)
Left	18.4	(16–22)
Weight of resection per breast (g)	1,815	(1,620–2,410)

reliable method. However, it has disadvantages including hypopigmentation, graft loss, failure to lactate, decreased sensation, and decreased breast projection [7–9]. Therefore, some authors have proposed avoiding the free-nipple method, and instead have suggested modifying the pedicle-reduction methods to achieve more reliable and aesthetically more pleasing methods [8, 10–13]. For example, Nahabedian et al. [10] modified the medial pedicle by narrowing the pedicle base and detaching the superior connections of the pedicle. Likewise, Gerzenshtein et al. [12] safely used the inferior pedicle in severely hypertrophic breasts by maximal preservation of the connections to the chest wall. Başaran et al. [13] tried to solve this problem by introducing a patient-based approach in another study. The technique relies on determining the major pedicle by using a color Doppler ultrasound and designing a pedicle that includes these vessels. This method has enabled a safer reduction for patients with severe macromastia.

Although various modifications of the pedicle breast reduction methods have been attempted, the free-nipple breast-reduction method is unfortunately inevitable for some patients. To achieve aesthetically desirable results, many authors have suggested various flap modifications to increase projection. These have included inferior, superior, lateral, and medial demoglandular flaps with various combinations and fixation techniques [7, 9, 14–17].

With the method described, a different approach has been attempted. The nipple–areola complex (NAC) is transferred over the full-thickness superomedial or superior pedicles instead of using various flap modifications to increase the breast mound. Therefore, a free-nipple breast reduction similar to conventional pedicle reductions has been achieved. This study aimed to evaluate the outcomes and complications of patients who underwent breast reduction using the aforementioned technique.

Patients and Methods

This study included 25 women who underwent surgery at our institution for severe macromastia using the modified free-nipple technique in 2011 and 2012. The women had a mean age of 43 years (range 34–59 years) and a mean body mass index (BMI) of 35.8 kg/m² (range 28–42 kg/m²). The chief complaints were back, shoulder, and lower back pain; submammary maceration; and limitation in physical activity.

Standard measurements including suprasternal notch–nipple distance and nipple–inframammary fold distance were performed. Of the 25 women, 11 had a history of smoking, 5 had type 2 diabetes mellitus, and 3 had hypertension. All the patients had surgery with the free-nipple graft-reduction technique due to risk factors (Table 1).

The patients were evaluated photographically to document the aesthetic results, particularly the projection. In addition, a score of 0–10 was assigned by the patients to indicate aesthetic satisfaction nearly 1 year after the surgery. The Regnault classification was used to document a ptosis. In addition, complications were listed for an evaluation of the overall results.

Patients Markings

The markings were made according to the classical Wise pattern (Figs. 1, 2, top left). With the patient standing, the sternal midline, inframammary fold (IMF), suprasternal notch, and breast meridian were marked. The new nipple position was determined to be the point at which the IMF intersected with the breast meridian. The amount of excision was determined by moving the breast medially and laterally. The length of the vertical limb beginning from the lower edge of the areola was 6.5 cm (9 cm from the nipple).

The length of the superior or superomedial pedicle was determined according to the estimated amount of resection. The maximum pedicle length was set at 10 cm to prevent compression in the vertical plane. The superomedial pedicle allowed a longer pedicle due to the rotational advantage. The mean length was 11 cm (range 8–14 cm). For the superior pedicle, the base of the pedicle was planned to be as wide as the areolar opening, with an average width of 8 cm in the superomedial pedicle. When deemed necessary, 8 × 8-cm rectangular flaps were planned to increase the inferior projection further.

Surgical Technique

Standard Wise-pattern breast-reduction skin incisions were made. First, the NAC was taken as a full-thickness skin



Fig. 1 *Left* demonstration of the major pedicle options for a NAC transfer. *Middle right* superior and superomedial pedicles prepared for NAC transfer. *S* superior, *SM* superomedial, *SL* superolateral

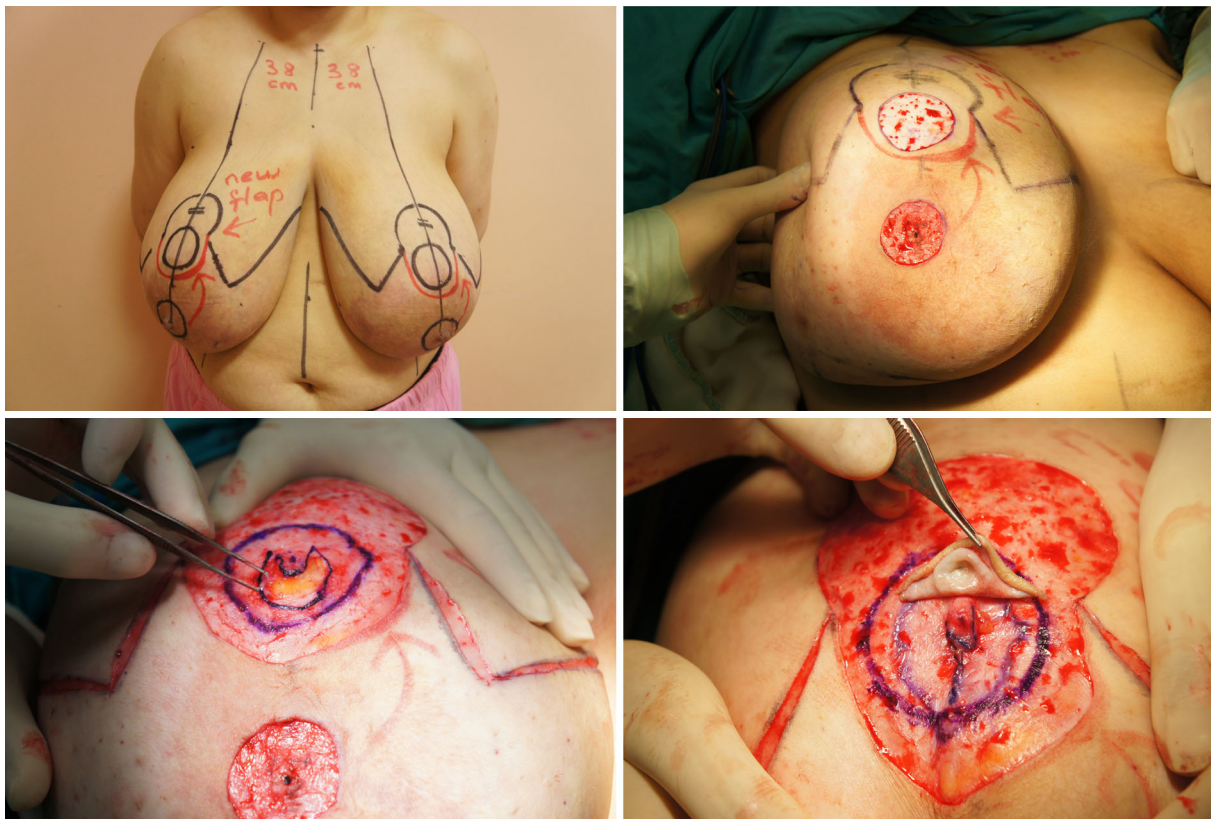


Fig. 2 *Top left* preoperative markings. *Top right* NAC taken as a full-thickness skin graft (FTSG). *Bottom left* dermal rectangular flaps (3 × 2 cm) prepared centrally to increase the nipple projection. *Bottom right* adaptation of the NAC to its new place on the superior pedicle

graft (FTSG) (Fig. 2, top right). Then, superior or superomedial flaps were prepared and deepithelialized. The newly determined site of the areola was marked on these pedicles using a marker. To increase nipple projection, 3 × 2-cm dermal rectangular flaps were prepared in the middle of the new NAC area (Fig. 2, bottom left). The NAC, prepared as an FTSG, was placed directly over this pedicle (Fig. 2, below right). Therefore, the subsequent stages of the operation were converted into a superior or superomedial pedicle-reduction mammoplasty technique. The inferior, medial, and lateral glandular tissues around the pedicle

were resected as a single piece (Fig. 3, top left). Depending on the pedicle, the NAC was placed in its new location with rotational (superomedial pedicle) or direct vertical (superior pedicle) maneuvers (Fig. 3, above right). During shaping, care was taken to avoid excessive thinning of the full-thickness dermoglandular pedicles or shearing of the pedicles from the thoracic wall.

To decrease the tension in the NAC and to provide stabilization, the full-thickness pedicles were sutured to the pectoral fascia at the level of the second intercostal space using 2/0 PDS sutures. In conditions of severe skin laxity

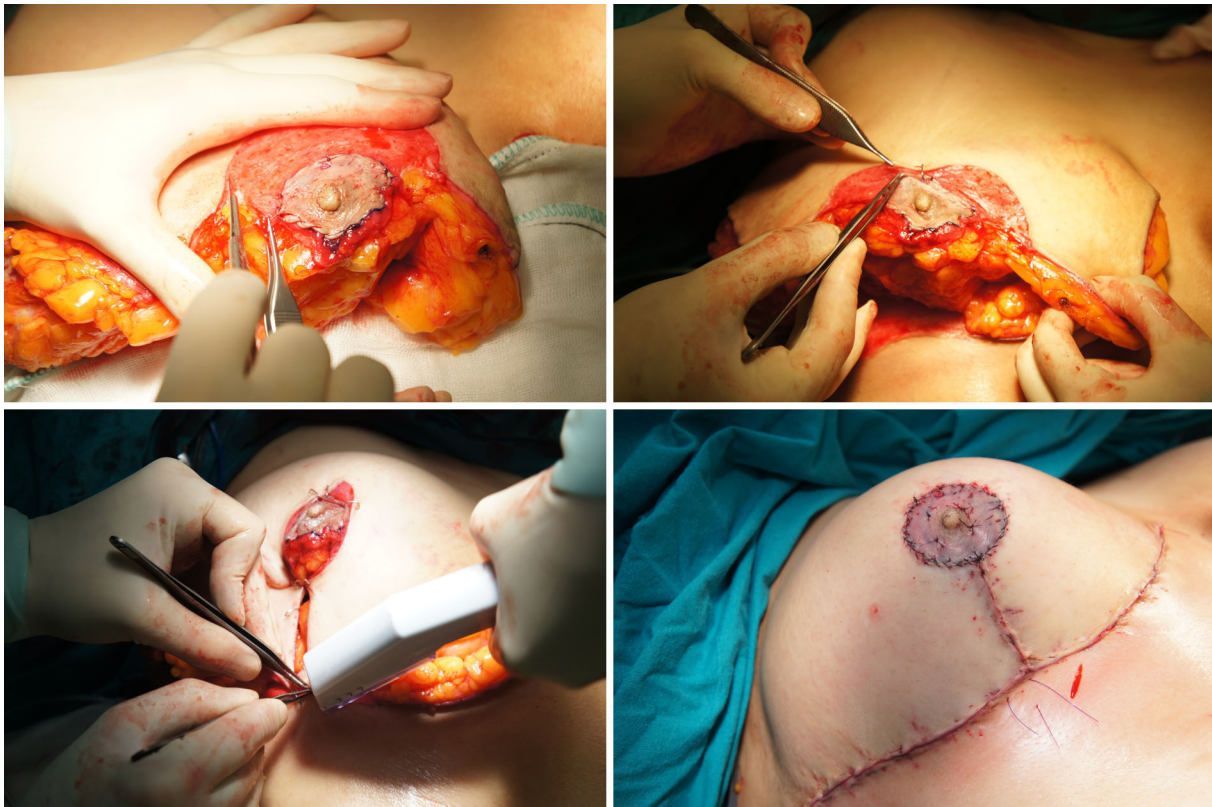


Fig. 3 *Top left* glandular resections performed leaving a full-thickness superior pedicle. *Top right* adaptation of the NAC to its new place. *Bottom left* skin flap closure. *Bottom right* final view with considerable breast projection

and inadequate projection, 8 × 8-cm inferior rectangular flaps were prepared as described earlier. These deepithelialized flaps were pulled upward and stabilized to the pectoral fascia at six points using 2/0 PDS.

After hemostasis, glandular and skin sutures were placed, and vacuum drains were inserted (Fig. 3, bottom left and right). The NAC applied as an FTSG was covered using a tie-over dressing with mild compression. Video 1 demonstrates the free-nipple breast-reduction technique performed with transfer of the NAC over the superior pedicle.

Results

The mean time to the follow-up visit was 19.2 months (range 17–25 months). The mean amount of resection per breast was 1,790 g (range 1,620–2,320 g) in the right breast and 1,840 g (range 1,710–2,410 g) in the left breast (Table 1).

The patients were followed up with respect to breast projection, shape, and NAC pigmentation. Breast projection and conical structure were preserved in all the patients during long-term follow-up evaluation. In the survey

conducted, with patients scoring their aesthetic satisfaction on a scale of 0 and 10, an average score of 8.8 (range 7.9–10) was obtained (scores of 8–10 denoted high satisfaction). No patients presented with breast ptosis.

Complications were particularly monitored to evaluate the overall results. None of the patients experienced total nipple-areola graft loss. One patient experienced minimal graft loss that did not require any treatment, and three others experienced a patchy hypopigmentation of the NAC. Four patients underwent revision of dog ears under local anesthesia (Table 2). All the patients were satisfied with the resolution of their symptoms as well as with the shape and projection of their breasts (Figs. 4, 5, 6).

Discussion

Numerous options have been described previously for breast reduction. Inferior, lateral, superolateral, superior, superomedial, central, and bipedicle approaches are among the most commonly used [1–6, 18]. Most of these techniques provide satisfactory results for mild or moderate levels of macromastia. The main problem occurs for patients who require large amounts of resection. For

Table 2 Complications

Complications	n (%)
Infection	0 (0)
Wound breakdown (T point)	3 (12)
Hematoma	1 (4)
Seroma	0 (0)
Hypertrophic scar	3 (12)
Dog-ear deformity	4 (16)
Partial nipple graft failure	1 (4)
Nipple necrosis	0 (0)
Nipple hypopigmentation	3 (12)
Bottom-out deformity	2 (8)

patients with severe hypertrophy, most of the pedicle techniques risk NAC circulation due to pedicle length and greater amounts of resection [17].

The most appropriate method for patients with severe macromastia remains controversial. Some reports state that the inferior pedicle method is more reliable with respect to the safety of the NAC [1, 4, 19]. However, when the amount of resection exceeds 1,000 g, wound-healing problems in the T area occur, with bottoming out and projection loss developing in the long term [15, 19].

The superomedial pedicle method modified by Hall-Findlay [18] allows resection of larger volumes with smaller complication rates. When the pedicle length increases, the circulation of the NAC is compromised. Besides, the long pedicle contributes to the development of bottoming out [20].

The free-nipple technique may be preferred especially for patients who have comorbidities such as diabetes mellitus, hypertension, vascular disease, or metabolic syndrome, or for patients considered to be candidates for delayed wound healing and complications due to risk factors such as obesity and smoking [18, 21]. Achieving aesthetic results has become the primary goal even in this group.

The classic free-nipple reduction mammoplasty often results in a widely based breast without projection, and recently, various dermoglandular pedicles have been used to provide augmentation of the central breast mound [7, 9, 14–17, 22, 23]. These flaps are mostly inferior- or superior-based flaps that have been dissected free of the pectoral fascia up to a certain extent to be shaped and transferred as needed. For example, Gorgu et al. [14] and Koger et al. [15] described the inferior dermoglandular pedicle modification for free-nipple reduction mammoplasty with or without backfolding. Romano et al. [24] and Misirlioglu and Akoz [16] used the superior dermoglandular pedicles, aiming to increase the central projection. In terms of

combined flap techniques, various combinations and fixation methods of superior and inferior flaps have been defined to increase the projection [7, 9, 25].

In this study, we used a different approach to increase the projection when we could not avert a free-nipple procedure for patients with severe gigantomastia who also were obese, had associated illnesses, or were actively smoking. The NAC was transposed to the full-thickness superomedial or superior dermoglandular pedicles during the first stage, in contrast to the procedures used in other studies. After this stage, the surgical procedure resembled a pedicle breast reduction. The pedicle that carried the NAC graft could thus be reduced and thinned in a way customized for each patient.

On the other hand, with all of the methods described earlier, after shaping and suturing of the flaps that increase the projection, the NAC is sutured directly to its final position as a standard. Although our technique shows similarities to the other techniques using the superior flaps, the thickness of the flap constructed in all them has a thickness that ranges between 1 and 4 cm [7, 9] because the authors have seen this as necessary for handling the flap [9, 26].

In contrast, the pedicles we prepared were pedicles that had not detached from their connections with the pectoral fascia. This provided a significant amount of central breast tissue, thereby achieving a conical shape. The effect of this modification is not limited only to providing an effective projection. The pedicle that has been constructed feeds from both the superficial subcutaneous tissues (the second and third intercostal branches of the internal mammary artery and the lateral thoracic artery) and the deep pectoral perforators [16]. In clinical practice, this condition provides the best viability for the NAC, which is placed as a full-thickness graft. We believe that this detail also contributes to minimizing the possibilities of total or partial graft loss or fat necrosis.

The described technique actually originates from the idea of switching to a free-nipple technique and removing the NAC in standard pedicle breast-reduction techniques when NAC circulation is compromised. The pedicle is shortened, and the NAC is placed in its new position under these circumstances. The NAC can even be placed on breast skin flaps in case of total pedicle circulation loss. This technique is currently used by many surgeons [27]. However, the important point is that this is a salvage method used as a last resort to save the nipple areola.

On the other hand, our technique is used for patients with comorbidities such as obesity, diabetes mellitus, hypertension, and smoking, in which a free-nipple technique is absolutely indicated. It is not a salvage method but rather a modification of the free-nipple breast-reduction technique. In our research, we have not found any case



Fig. 4 *Left* preoperative views. *Right* postoperative 17th-month views after reduction performed with transfer of the NAC on the superomedial pedicle. The mean weight of resection per breast is 1,670 g

series in which this procedure was used as a very effective projection-increasing modification of the free-nipple method.

Many projection-increasing modifications have been defined in literature, as stated. How were the projection-increasing effects of these techniques assessed? We examined the texts of similar studies before conducting our study. Nearly all the authors preferred photographic evaluation to assess the obtained projection [9, 14, 17, 23]. For example, Casas et al. [23] evaluated their patients with photographs taken preoperatively, immediately after surgery, and 36 months later. They evaluated the results for satisfactory long-term breast projections, complete pigmentations, and absence of bottom-out deformities.

Özerdem et al. [9] in their six-case series stated that four patients had wound breakdowns and that all the patients had small hypopigmentations. The aesthetic result was assessed by the primary surgeon, and it was stated that cone-shaped fullness was seen in all the patients.

Karsidag et al. [17] used five main criteria evaluated by the surgeons: long-lasting result, acceptable projection or not, uniform areola, conical breast shape, and bottom-out deformity. All the evaluations were performed photographically, and satisfactory results were reported.

Güven et al. [7] also used the Regnault classification together with photographic evaluation. Ptosis was not encountered in any of the patients.

In our study, we conducted a survey regarding aesthetic satisfaction approximately 1 year after the surgery. In addition, we also thought the complications must be taken into account for evaluation of the overall results. Therefore, surgeon's primary assessment, a patient survey, and listing of the complications were used to evaluate to overall results.

We believe the technique we used has some advantages. The greatest advantages are its effectiveness in providing breast projection equivalent to pedicle breast-reduction techniques and its choice of method by the surgeons, who can choose a method to which they are accustomed and that they believe yields good results. Although superior and superomedial pedicle techniques currently are more popular, some surgeons may prefer to use a different pedicle with which they are more comfortable. In that respect, this technique can be used by adaptation to superolateral, central, or even inferior-pedicle-reduction techniques (Fig. 1).

We used the superior pedicle for 19 of the 25 patients and the superomedial pedicle for 6 of the patients. These two pedicles are the most commonly used in our



Fig. 5 *Left* preoperative views. *Right* postoperative 18th-month views after reduction performed with transfer of the NAC on the superior pedicle. The mean weight of resection per breast is 1,710 g

department, and this influenced our preference. In addition, the internal mammary artery, which provides significant perfusion to the breast, was included with these two pedicles, which was influential in our decision. In choosing between two pedicles, the superomedial pedicle may be advantageous in achieving a larger breast due to its rotational advantage. The superior pedicle has a folding limitation in a single plane and a vertical axis. Therefore, it should be remembered that a more limited flap might be constructed with the superior pedicle. In addition, although this technique was applied to the Wise-pattern incisions, in which the skin excisions are determined during patient markings, it should be remembered that the technique could be adapted to vertical pattern reductions.

To document the overall effectiveness of the technique, complications should be monitored as well. We detected dog-ear deformity at a rate of 16 %. The explanation for this might be that the procedure gives the tissue a chance to pull itself together by avoiding incisions extending beyond the axillary line and the sternal midline, initially. Of course, in case the surgeon does not wish to take the risk of a second procedure, the incisions may be extended during the first surgery, thus preventing a dog ear.

The wound breakdown rate was found to be 12 %, especially in the T region. Such a problem might be expected in patients with multiple comorbidities (diabetes mellitus, hypertension, smoking, obesity) and abnormal wound-healing patterns. However, all wound breakdowns were resolved with repeated wound dressings and small debridements. No patients underwent a major procedure due to this problem.

No pedicle necrosis, and therefore no NAC loss, was observed during the follow-up period. An explanation might be the preparation of short but effective pedicles to create a projection. Constructing the pedicles with ideal dimensions, allowing easy rotations (superomedial pedicle) or advancements (superior pedicle), enabled the pedicles to be quite safe. In addition, better fixation of the pedicles on the chest wall might explain the low ratio of bottom-out deformity observed (8 %).

In summary, the study we performed differs in many aspects from previous modifications. In many of the projection-increasing techniques mentioned earlier, dermoglandular flaps were used independently of the nipple areola. However, with the current technique, pedicles are used as a carrier, connected to the nipple areola, and



Fig. 6 *Left* preoperative views. *Right* postoperative 19th-month views after reduction performed with transfer of the NAC on the superior pedicle. The mean weight of resection per breast is 1,680 g

specific to the person. Selection of the strongest pedicle thickness of flaps, deep almost to the pectoralis fascia; application of the same method to other pedicles according to the surgeon's preferences; and the potential to use a vertical pattern should be noted [13].

Although we consider that we have obtained aesthetically successful results, the disadvantages of the free-nipple technique (e.g., loss of sensation and lactation and depigmentation risk) are valid also for our technique. Nevertheless, patients who are candidates for this method, as in our study, are mostly those who have passed the reproductive period and request aggressive amounts of reduction. For these patients, who experience severe functional loss and have significant risk factors, the free-nipple technique may be inevitable. The final aesthetic results achieved with this technique decrease the significance of many of the disadvantages of the free-nipple technique.

In conclusion, we believe that transfer of the NAC to the superior or superomedial pedicles may significantly decrease projection loss, which is one significant disadvantage of the reported technique otherwise. However, this technique should not be compared with pedicle techniques in terms of advantages. The surgeon should always choose

the pedicle technique initially when considering the many disadvantages of the free-nipple method. However, despite certain risk factors, which are inevitable with a free-nipple technique, the primary aim should be to achieve the best aesthetic outcome. This can be possible by the method described, in which pedicles are designed and the NAC is transferred to them as if a pedicle technique is being performed. Therefore, we strongly encourage surgeons to keep this modification in their surgical armamentarium for patients requiring a free-nipple-reduction technique.

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References

1. Robbins TH (1977) A reduction mammoplasty with the areola nipple based on an inferior dermal pedicle. *Plast Reconstr Surg* 59:64–67
2. Skoog T (1963) A technique of breast reduction; transposition of the nipple on a cutaneous vascular pedicle. *Acta Chir Scand* 126:453–465
3. Cárdenas-Camarena L (2009) Reduction mammoplasty with superolateral dermoglandular pedicle: details of 15 years of experience. *Ann Plast Surg* 63:255–261

4. Lejour M (1994) Vertical mammoplasty and liposuction of the breast. *Plast Reconstr Surg* 94:100–114
5. Balch CR (1981) The central mound technique for reduction mammoplasty. *Plast Reconstr Surg* 67:305–311
6. McKissock PK (1976) Reduction mammoplasty by the vertical bipedicle flap technique. Rationale and results. *Clin Plast Surg* 3:309–320
7. Güven E, Aydın H, Başaran K, Aydın U, Kuvat SV (2010) Reduction mammoplasty using bipediced dermoglandular flaps and free-nipple transplantation. *Aesthet Plast Surg* 34:738–744
8. Lacerna M, Spears J, Mitra A, Medina C, McCampbell E, Kiran R, Mitra A (2005) Avoiding free nipple grafts during reduction mammoplasty in patients with gigantomastia. *Ann Plast Surg* 55:21–24
9. Özerdem OR, Anlatici R, Maral T, Demiralay A (2002) Modified free-nipple graft reduction mammoplasty to increase breast projection with superior and inferior dermoglandular flaps. *Ann Plast Surg* 49:506–510
10. Nahabedian MY, McGibbon BM, Manson PN (2000) Medial pedicle reduction mammoplasty for severe mammary hypertrophy. *Plast Reconstr Surg* 105:896–904
11. Wettstein R, Christofides E, Pittet B, Psaras G, Harder Y (2011) Superior pedicle breast reduction for hypertrophy with massive ptosis. *J Plast Reconstr Aesthet Surg* 64:500–507
12. Gerzenshtein J, Oswald T, McCluskey P, Caplan J, Angel MF (2005) Avoiding free-nipple grafting with the inferior pedicle technique. *Ann Plast Surg* 55:245–249
13. Başaran K, Ucar A, Guven E, Arinci A, Yazar M, Kuvat SV (2011) Ultrasonographically determined pedicled breast reduction in severe gigantomastia. *Plast Reconstr Surg* 128:252e–259e
14. Gorgu M, Ayhan M, Aytug Z, Aksungur E, Demirdover C (2007) Maximizing breast projection with combined free nipple graft reduction mammoplasty and back-folded dermoglandular inferior pedicle. *Breast J* 13:226–232
15. Koger KE, Sunde D, Press BH, Hovey LM (1994) Reduction mammoplasty for gigantomastia using inferiorly based pedicle and free-nipple transplantation. *Ann Plast Surg* 33:561–564
16. Misirlioglu A, Akoz T (2005) Familial severe gigantomastia and reduction with the free-nipple graft vertical mammoplasty technique: report of two cases. *Aesthet Plast Surg* 29:205–209
17. Karsidag S, Akcal A, Karsidag T, Yesiloglu N, Yesilada AK, Ugurlu K (2011) Reduction mammoplasty using the free-nipple-graft vertical technique for severe breast hypertrophy: improved outcomes with the superior dermoglandular flap. *Aesthet Plast Surg* 35:254–261
18. Hall-Findlay EJ (1999) A simplified vertical reduction mammoplasty: shortening the learning curve. *Plast Reconstr Surg* 104:748–759
19. Mandrekas AD, Zambacos GJ, Anastasopoulos A, Hapsas DA (1996) Reduction mammoplasty with the inferior pedicle technique: early and late complications in 371 patients. *Br J Plast Surg* 49:442–446
20. Hawtof DB, Levine M, Kapetansky DI, Pieper D (1989) Complications of reduction mammoplasty: comparison of nipple-areolar graft and pedicle. *Ann Plast Surg* 23:3–10
21. Chen CL, Shore AD, Johns R, Clark JM, Manahan M, Makary MA (2011) The impact of obesity on breast surgery complications. *Plast Reconstr Surg* 128:395e–402e
22. Aydın H, Bilgin-Karabulut A, Tümerdem B (2002) Free-nipple reduction mammoplasty with a horizontal scar in high-risk patients. *Aesthetic Plast Surg* 26:457–460
23. Casas LA, Byun MY, Depoli PA (2001) Maximizing breast projection after free-nipple-graft reduction mammoplasty. *Plast Reconstr Surg* 107:955–960
24. Romano JJ, Francel TJ, Hoopes JE (1992) Free-nipple graft reduction mammoplasty. *Ann Plast Surg* 28:271–276
25. Abramson DL (1999) Increasing projection in patients undergoing free-nipple graft reduction mammoplasty. *Aesthet Plast Surg* 23:282–284
26. Serra MP, Longhi P, Sinha M (2010) Breast reduction with a superomedial pedicle and a vertical scar (Hall-Findlay's technique) experience with 210 consecutive patients. *Ann Plast Surg* 64:275–278
27. Chestak KC (2013) Revision surgery following breast reduction and mastopexy. In: Neligan PC (ed) *Plastic Surgery*, vol 5 (Breast), 3rd edn. Elsevier, Saunders, Philadelphia, p. 247