

A Modified Central Pedicle Technique for Breast Reduction

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ABSTRACT

Breast reduction is a common plastic surgical procedure. The indication of surgery is either functional, aesthetic or both. In this study, we describe our modification and clinical experience with the central pedicle technique for breast reduction. The surgical technique was applied to 20 cases of macromastia (breast enlargement) of various degrees of severity. The technique entails separate handling of the skin and parenchyma. The skin is partially excised, using the conventional keyhole pattern. The breast parenchyma is widely separated from the 2-3 cm-thick skin flaps. Dissection stops 2 cm from the chest wall to assure vascular contribution from the lateral thoracic artery, the internal mammary perforators, the intercostal perforators and the thoracoacromial artery. The central pedicle is reduced by excising slices of the breast tissue in a slanting manner. The skin is re-draped around the reduced pedicle, leaving an inverted T-shaped scar. The technique is simple, reliable and versatile. It is applicable to all degrees of macromastia.

INTRODUCTION

Reduction mammoplasty is one of the most common operations performed on the female breast [1]. The operation may be indicated to relieve symptoms related to the abnormal increase in weight and size of the breast or to improve its cosmetic appearance [2]. It requires accurate preoperative planning and preservation of the vascular supply to the skin, nipple and the gland [3]. In spite of the recent attempts at reducing or minimizing the final scar after the operation, breast reduction with transposition of the nipple and areola complex (NAC) and a final inverted T-shaped scar, is considered the traditional method for managing severe macromastia and extreme ptosis [4-6]. One of the currently used methods for breast reduction that results in an inverted T-shaped scar is the central pedicle technique. The technique was evolved over decades from the single-stage breast reduction technique described by Biesenberger and its subsequent modifications [7-12]. However, the original technique and its modifications were associated with ischemic complications due to violation of the vascular supply of the

pedicle and/or the skin flaps. Clear understanding of the blood supply of the breast led to the development of the most popular central pedicle technique described by Hester and his associates [13]. In Hester's technique, the central pedicle carrying the NAC receives its vascular supply from all the vessels supplying the breast, including branches from the lateral thoracic, internal mammary, the lateral intercostal and the thoracoacromial vessels (Fig. 1).

In this paper we describe our experience and modifications on Hester's technique for breast reduction.

MATERIAL AND METHODS

Patient population:

The study was done on 20 adult female patients complaining of various degrees of bilateral macromastia and breast ptosis. Their ages ranged between 18 and 38 years (average 25 years). Of these patients, 8 were married (40%) and 12 were singles (60%) at the time of operation. The presenting complaint was disfiguring, huge breasts in all of them. Associated physical symptoms were reported by cases requiring reduction of 500 gm breast tissue or more. These included back pain, shoulder pain, neck pain, local pain, intertrigo and hyperpigmentation in the inframammary fold. The severity of macromastia was estimated according to the amount of excised breast tissue postoperatively. Indications for reductions are shown in Table (1).

Operative technique: The technique used is a modification of Hester's technique [13].

The skin markings are done with the patient in the sitting or standing position. The new position of the nipple is located on the breast meridian just below the level of the inframammary crease [14]. The diameter of the NAC is made 4-5 cm, centered

on the new location of the nipple. A wider circle is marked outside the outline of the reduced NAC. The design of the skin brassier is outlined using a hand-made flexible wire pattern.

Special consideration is given to patients with severe macromastia with the nipple hanging at or below the level of the umbilicus. In these cases:

- The standing position is required and the breast mass is slightly supported during marking. This is because the supra-areolar skin is markedly stretched and if the breast tissue is not supported, overriding nipple deformity will occur.
- The angle of the keyhole pattern is narrower and the distance between the NAC and the IMC is longer (6 cm). This is because of the relatively limited safe extent of parenchymal resection. This would result in a large central pedicle that requires a larger skin brassier.

The surgical procedure is the same regardless the breast size (Fig. 2). The operation is done under general anaesthesia.

- 1- Surgery starts by circumcising the reduced NAC and the outer circular mark down to the dermis. The doughnut shaped area around the reduced NAC is de-epithelialized (Fig.2-a).
- 2- The scratch markings of the keyhole pattern, the medial and lateral upper horizontal limbs and the IMC are deepened to the subcutaneous tissue (Fig. 2-b). The excess skin outside the de-epithelialized area is excised in a subcutaneous plane (Fig. 2-c).
- 3- The incisions of the keyhole pattern and the upper horizontal limbs are deepened and 2-3 cm-thick skin flap is dissected medially to near the perforators of the internal mammary artery and laterally to the anterior axillary line, without exposing the pectoralis major and serratus anterior muscles. The medial and lateral flaps are joined by dissection superiorly to the infraclavicular region. This is the only direction where dissection reaches the pectoral fascia.
- 4- The breast parenchyma is exteriorized (Fig. 2-d). Reduction of the parenchyma proceeds by resection of slices of the breast tissue, starting at the outer margin of the de-epithelialized area around the reduced NAC and slanting towards the periphery to keep maximal attachment of the central pedicle to the anterior chest wall (Fig. 2-e). Resection from the inferior quadrant may not be needed if sufficient reduction was achieved by resection from the other three quadrants as judged from the size of the pedicle.

- 5- Finally, hemostasis, wound closure and suction drainage are done as usual. Hypo-allergic porous skin tapes are applied and the breasts are covered with supporting brassier.

The differences between the Hester's technique and our modified technique are summarized in Table (2).

Postoperatively, the drains are removed after 48 hours. The circumareolar stitches are removed after 7 days and the remaining stitches are removed after 14 days.

Documentation is done by pre-and post-operative photography and by recording the weight of the resected breast tissue and distance of nipple transposition.

RESULTS

We applied the central pedicle technique for breast reduction in 20 cases (40 breasts) of various degrees of macromastia over the last three years. The results were acceptable by the patients from both aesthetic and clinical points of view. Aesthetically pleasing breast contour, symmetry and nipple sensitivity were reported by 90% of our patients (Fig. 3). All cases requiring resection of 500 gm or more of breast tissue reported relief of the clinical symptoms, especially the four patients in whom resection of 1000 gm or more of breast tissue was done.

The amount of reduction ranged between 200 and 1750 gm per breast, with an average of 570 gm/breast. The extent of nipple transposition ranged between 7 and 38 cm, with an average of 13.9 cm (Fig. 4).

Reactionary hemorrhage occurred in the right breast of one patient (2.5% of all breasts) and it required exploration.

Vascular complications occurred in 10 breasts (25% of all breasts). It included, necrosis and/or disruption of the margins of the inverted T-shaped scar in 5 breasts (12.5%), superficial desquamation of the areola in 3 breasts (7.5%) and marginal necrosis of the areola and 2 breasts (5%).

Nipple sensitivity to touch was preserved bilaterally in 16 cases and unilaterally in 2 cases. In the remaining six breasts (15%) Temporary diminished of nipple sensation (5 breasts) and temporary loss (one breast), were observed in the early post operative period. Complete recovery of nipple sensitivity occurred 6 months postoperatively.

Hypertrophic scarring developed bilaterally in the transverse limb of the inverted T-shaped scar in 3 cases (15%). Resolution under topical steroid and breast lifting with supporting brassier occurred within 6 months except in one case due to lack of compliance with treatment.

The breast contour and the degree of breast lifting were satisfactory in 18 cases (90%), from both the surgeon's and the patient's points of view. Two patients (10%), complained of late gravitational descent of the gland with relative flattening in the supra-areolar region.

The complications of our technique are summarized in Table (3).

Table (1): Indications of breast reduction based on the clinical symptoms and the amount of reduction.

Indication of surgery	Amount of reduction	Number of cases (N=20 patients)
Aesthetic	Less than 500 gm/breast	6 patients (30%)
Medical	1000 gm or more/breast	4 patients (20%)
Mixed	500-1000 gm/breast	10 patients (50%)

Table (2): Differences between the author's technique and Hester's technique of breast reduction.

Points of comparison	Amount of reduction	Hester's technique
1- Flap design	Pre-determined by key-hole pattern	Free-hand technique at the end of the operation
2- De-epithelialized area	Circular around the reduced areola	Triangular with its base at the infra-mammary crease
3- Extent of superior dissection	Reaches the pectoral fascia	Stops 2 cm from the chest wall
4- Dermoglandular reduction	Independent excision of excess skin and glandular tissue	30-35% of reduction is achieved at the time of final trimming of the thick flaps
5- The amount of reduction	200-1750 gm/breast (average = 570 gm/breast)	90-1300 gm/breast (average = 650 gm/breast)
6- The distance of nipple transposition	7-38 cm (average = 13.9 cm)	Any distance

Table (3): Complications of breast reduction by the central pedicle technique.

Complication	Incidence (N = 40 breasts)
Reactionary hemorrhage	2.5%
Necrosis and/or disruption of the inverted T-shaped scar	12.5%
Superficial desquamation of the areola	7.5%
Marginal necrosis of the areola	5%
Temporary diminished nipple sensation	12.5%
Temporary loss of nipple sensation	2.5%
Hypertrophic scarring	15%
Gravitational descent of the parenchyma and overriding nipple	10%

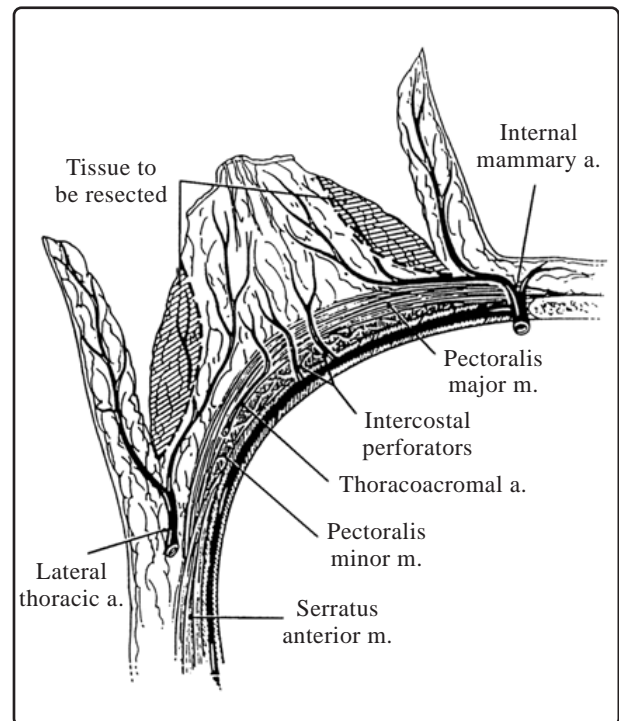


Fig. (1): The vascular basis of the central pedicle technique for breast reduction. Note that the dermoglandular branches of the internal mammary perforators and the lateral thoracic artery divide into glandular, supplying the central pedicle and cutaneous, supplying the skin flaps. Hester T.R., et al. (1985).



Fig. (2-A)



Fig. (2-B)

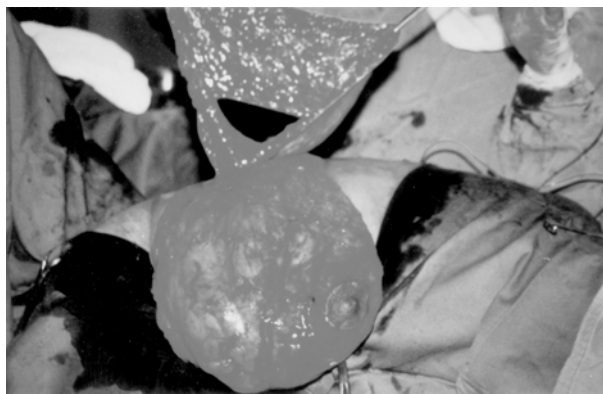


Fig. (2-C)

Fig. (2): Surgical technique.

A- De-epithelialization of doughnut shaped area around the reduced areola.

B- Skin incisions.

C- Skin excision in a subcutaneous plane and exteriorization of the breast tissue.



Fig. (2-D)



Fig. (2-E)

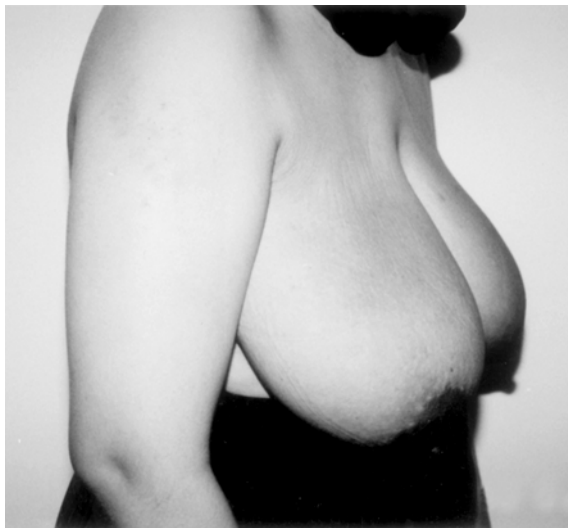
Fig. (2): Surgical technique.

D- Excision of slices of breast tissue in a slanting way from the periphery of the de-epithelialized area to stop 2-3 cm from the chest wall.

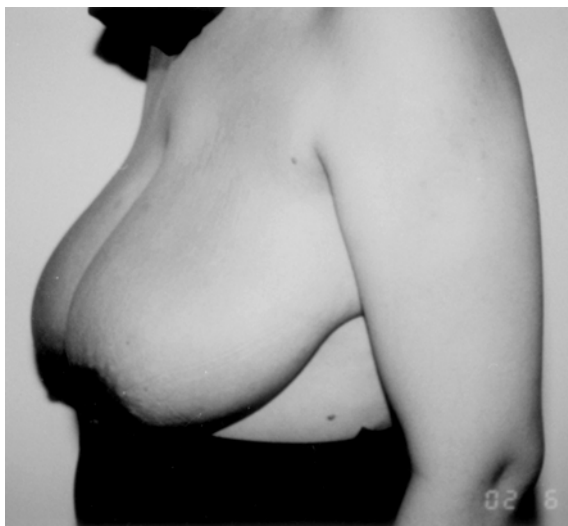
E- The central pedicle after reduction of the exteriorized breast tissue.



(A)



(B)



(C)



(D)



(E)



(F)

Fig. (3): Case # 10: A 30 year-old, married female, with macromastia, treated by the central pedicle technique of breast reduction.

- a- Pre-operative anterior view.
- b- Pre-operative Rt. lateral view.
- c- Pre-operative Lt. lateral view.

Fig. (3): The same patient after excision of 750 gm from the Rt. breast and 700 gm from the Lt. breast.

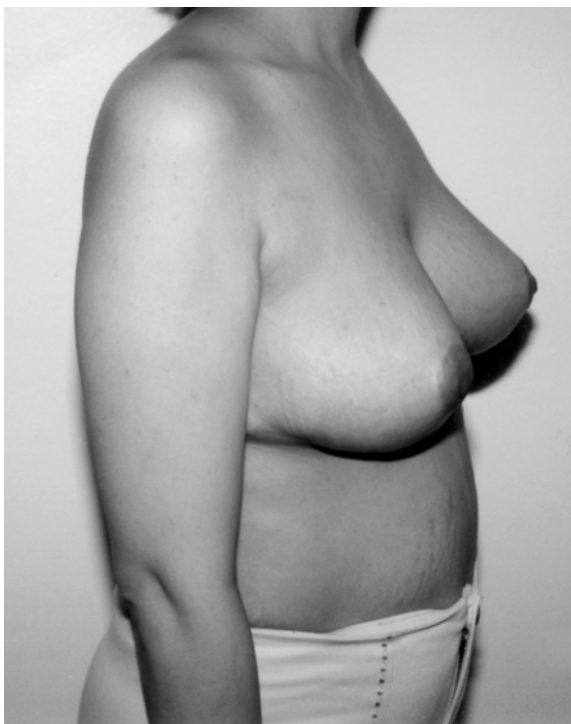
- d- Post-operative anterior view.
- e- Post-operative Rt. lateral view.
- f- Post-operative Lt. lateral view.



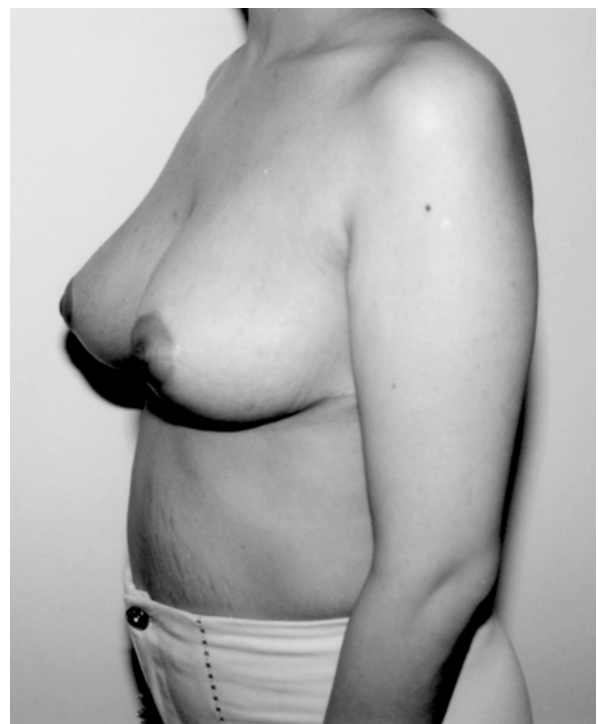
(A)



(B)



(C)



(D)

Fig. (4): Case # 4: A 30 year-old, married female with mild degree of macromastia. 200 gm were excised from each breast. The NAC was shifted 12 cm up. The indication of surgery was purely aesthetic. Breast projection is maintained more than one year after surgery.

a- Pre-operative lateral view.

b- Post-operative lateral view.

DISCUSSION

The goal of breast reduction is to produce a breast shape and size that conforms to the patient's body proportions, while preserving the aesthetic features of the breast are both visual and tactile [15].

Over the last century, several breast reduction techniques were described to reduce the size of the enlarged breast and simultaneously correct ptosis. The pedicle carrying the NAC in any of these techniques is based on one or more of the main sources of the blood supply to the breast [3,4,16-20]. On the contrary, the central pedicle technique described by Hester relies on the best possible blood supply to the glandular pedicle from all sources [13].

The central pedicle technique in current use is the end result of serial modifications of Biesenberger's technique [7]. The latter technique was associated with ischemic complications due to the extensive skin undermining. The remaining breast tissue was deprived from blood supply by twisting of the remaining glandular pedicle. Attempts of avoid these ischemic complications were subsequently developed by leaving a ring of dermis around the NAC to preserve to dermal blood supply [8] and by conservative tangential resection of the isolated glandular tissue [9], or glandular resections sparing the outer segment of the breast, either totally or partially [10-12]. These modifications did not significantly lower the ischemic complications till the vascular anatomy of the breast was clearly described [13].

The blood vessels supplying the breast form a cutaneoglandular plexus of vascular arcades concentrated at the periphery, which give branches to the skin and the parenchyma [21]. Therefore, dissection of the glandular pedicle should stop 2-3 cm from the chest wall and the skin flaps should be kept at least 2 cm thick for their maximal viability [13,22]. This explains why the previous central mound techniques were associate with high incidence of vascular complications [7,10].

The nerve supply to the NAC has been recently described [23]. A study on nipple-areola sensitivity in patients undergoing reduction mammoplasty by the central pedicle technique showed an overall retention of the nipple areola sensitivity in 90.5% of cases [24]. This result is superior to the nipple-areola sensitivity after breast reduction by the inferior pedicle technique [25]. A recent anatomical study on the intact nerve branches in the superior and inferior pedicles revealed that most of the

preserved nerve branches are located in the central part of the pedicle [26]. These studies explain why the nipple sensitivity to touch is markedly preserved in our series.

The complications of breast reduction by the central pedicle technique are few and may occur with any type of breast reduction operations. Most of these complications are related to the inverted T-shaped scar, which is often unsatisfactory from the aesthetic point of view. There is a debate regarding how to maintain attractive breast shape and projection. The use of sutures for glandular suspension and re-shaping was described in techniques involving wide undermining of the breast base [5,27,28]. This is not applicable to the central pedicle technique which is based on keeping maximal attachment of the pedicle to the chest wall for maximal preservation of the vascularity. Therefore, we depended in our cases on the skin brassier, supporting the reduced breast mass. However, this is questionable because wide separation of the gland from the skin would result in loss of fascial support and postoperative ptosis [23]. This is the reason of late glandular ptosis reported in two of our cases.

Both Hester's technique and our modification share the vascular safety, superior sensory recovery and versatility, being applicable to all grades of macromastia with reasonable aesthetic outcome. The main disadvantage of Hester's technique is that it is a free-hand technique in both inferior glandular resection and final positioning of the NAC. Free-hand technique is time-consuming and need experience. It may be difficult to achieve symmetry, especially for final location of the NAC at the end of the operation [29].

The basic advantage of our modified central pedicle technique is the simple operative design, which is easy to learn and execute by plastic surgeons in their early training period. Because it is based on pre-determined landmarks, the results are both predictable and reproducible.

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