

## Original article

### BREAST REDUCTION: A CASE SERIES ANALYSIS

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#### Summary

Reduction mammoplasty is one of the most common procedures performed by plastic surgeons. Surgeons select the technique that best suits each patient based on the surgeon's experience, specific patient characteristics and requirements. The purpose of this article is to report the complications that occurred in patients who underwent reduction mammoplasty at our institution, and to compare our data to the current literature. We studied the postoperative complications from 82 breast reductions (41 patients), which used superior pedicle (n = 6), inferior pedicle (n = 36), medial pedicle (n = 10) or Thorek (n = 30) techniques. The most common postoperative complications were hematoma (7%), seroma (2.5%), delayed wound healing (14%), partial nipple loss (4.8%), infection (10%) and asymmetry (12%). We observed complications in 64% of patients that underwent inferior pedicle breast reduction with an inverted T scar. One possible explanation for this complication rate is that inferior pedicle Wise-pattern mammoplasty is usually performed for breasts with sternal notch-to-nipple distances greater than 32 cm, or for symptomatic macromastia, and greater amounts of resected tissue are known to be associated with higher complication rates. Nevertheless, this technique is associated with excellent patient satisfaction. Indeed, complications are quite frequent and may occur even in the most suitable candidates, but do not compromise the final result.

#### Introduction

The female breast has always been a symbol of sexuality, motherhood and nurturing. The symbolism of maternity and breastfeeding has gone hand in hand throughout history, religion and, especially, art (1). However, Women with macromastia or gigantomastia often suffer both physically and psychologically. Compared to women with smaller-sized breasts, they experience more problems with back and neck pain, grooves caused by the pressure of bra straps, poor posture and exercise intolerance (2). Skin in the breast area is prone to intertrigo, maceration and infections as a result of heavy, pendulous breasts (3,4). Thus, reduction mammoplasty is commonly

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performed for symptomatic macromastia. The procedure involves reducing the glandular, adipose and skin tissues, with subsequent nipple–areola repositioning. The goal of breast reduction is to reduce both the adverse physical effects of large breasts and the negative psychosocial effects.

The surgical techniques for breast reduction have evolved in response to a wide variety of patients. The surgeon must be able to tailor the most appropriate surgical technique to each patient. Currently, breast reduction surgery is safe, effective and beneficial for the patient (5); however, it has been reported to be associated with complications in 32% of patients (6). The complication risk increases as the quantity of resected tissue increases (7). The purpose of this article is to report complications that occurred in patients who underwent reduction mammoplasty at our institution, and to compare this data with the current literature.

### Material and Methods

Between January 2010 and March 2016, 41 female patients underwent breast reduction at the Cutaneous, Regenerative, Minimvasive and Plastic Surgery Unit, Plastic Surgery Section, Department of Surgical Sciences, University of Parma, Italy. One senior surgeon performed all of the surgeries with the help of a surgical assistant. We recommended that patients quit smoking, or substantially reduce the number of cigarettes they smoked, and avoid oral contraception for at least one month before surgery. The surgery was performed under general anesthesia, and patients were typically discharged three days' post-surgery. All patients were given antibiotics to reduce the risk of infection associated with the procedure. Surgeons should always consider giving perioperative antibiotics in breast reduction procedures, taking into account patient risk factors, allergies and the potential for antibiotic resistance. Postoperatively, all patients received prophylactic low-molecular-weight heparin during their hospital stay to help prevent major complications such as deep vein thrombosis and pulmonary embolism.

There are many different surgical techniques [8–14] for breast reduction. We chose the technique based on the breast shape, volume and ptosis, and performed a total of four different kinds of surgery: superior pedicle in 3 patients (15), inferior pedicle in 18 (9,10), medial pedicle in 5 (11) and the Thorek technique in 15 (12,13). Vertical and inverted T skin resection patterns can be used for different pedicles. We used vertical skin incision patterns (16) for superior pedicles, but a Wise-pattern reduction mammoplasty with inverted T skin incisions (17) for all other cases. One drain for aspiration was left in each breast until the output was less than 50 mL in 24 hours (usually after 48h), to decrease the risk of seroma and developing hematoma.

Patients were classified as non-obese (BMI  $\leq 29$ ), moderately obese (BMI of 30–40) and greatly obese (BMI  $> 40$ ). Complication data was further stratified into acute, subacute and long-term complications.

### Results

The 41 patients had an average age of 39.5 years (range, 18 to 67 y) and a mean body mass index of 31 kg/m<sup>2</sup> (range, 24.7 to 57 kg/m<sup>2</sup>). The mean preoperative sternal notch-to-nipple distance was 27 cm (range, 22 to 39 cm). Fourteen patients smoked (34%). The mean total weight of resected breast tissue was 1815 g (range, 685 to 3100 g), and the mean operative time for reduction mammoplasty was 120 minutes (range, 50 to 195 min). The mean clinical follow-up period was 6 months (Table 1). In accordance with the literature (18–20), we performed superior (3 patients; 7.3%) or medial pedicles (5 patients; 12.2%) for smaller breast reductions ( $\leq 999$  g total resected tissue), and when the length of the pedicle-based flap was 10 cm or less. Inferior pedicles were performed (18 patients; 43.9%) for larger breast reductions (total resected tissue 1000–1500 g) when the NAC was 32–34 cm, and the length of pedicle-based flap exceeded 12 cm. The Thorek technique (15 patients; 36.6%) was performed when the distance between the nipple-

areola complex (NAC) was greater than 35–40 cm, and the estimated excess of tissue to be removed was >1500 g (Table 2).

We evaluated the correlation between the complication rates and the type of surgical technique used. Postoperative complications were frequent following breast reduction surgery, occurring in 25 patients (61%). Lower T-junction wound

dehiscence was the most common complication at the surgical site, occurring in six patients (14%): 3 patients with an inferior pedicle, 1 patient with a medial pedicle, and 2 patients with the Thorek technique. We observed infection in 4 patients (10%): 1 patient with a medial pedicle and 3 patients with an inferior pedicle, both with inverted T scars. A hematoma (Figure 1) was seen in 3 pa-

Variable	Mean	Range
Age, in years	39,5	18 - 67
Body mass index	31	24,7 - 57
Sternal notch-to-nipple distance, cm	27	22 - 39
Total resection weight of breast tissue, grams	1815	685 - 4250 g
Time for reduction mammoplasty, minutes	120	50 - 195 minutes

**Table 1:** General data on the patients.

Surgical technique	Superior pedicle	Inferior pedicle	Medial pedicle	Thorek
Total tissue resected	1038g (685-1630)	2320g (1970-3100)	1390g (950-2450)	2513g (2100-4250)
Age	36,6 years (33-40)	37,7 years (32-44)	33,2 years (18-41)	44,2 years (37-67)
Number of patients	3 (7,3%)	18 (43,9%)	5 (12,2%)	15 (36,6%)

**Table 2:** Characteristics of the patients and surgical techniques



**Figure 1:** Hematoma

tients (7%) and a seroma in 1 (2.5%); two of the hematomas and the seroma occurred with the inferior pedicle technique, and the other hematoma was seen with the Thorek technique, because the reduction of the mammary parenchyma was remarkable. No blood transfusions were required. Partial areola necrosis (Figure 2) occurred in 2 patients (4.8%), 1 with an inferior pedicle and 1 with the Thorek technique; no total areola necrosis was observed. Other long-term complication included hypertrophic scarring in 1 patient (2.4%) with an infe-

rior pedicle breast reduction; loss of upper pole breast fullness (bottoming-out; Figure 3) in 3 patients (7.3%) with inferior pedicle breast reduction; and asymmetry (Figure 4) with nipple malposition or "dog ears" in 5 patients (12%), 2 with inferior pedicles, 1 with a medial pedicle, 1 with a superior pedicle, and 1 with the Thorek procedure. No other complications were observed.

We noted that 64% of the patients with complications in our study (16 out of the 25 with complications) had inferior pedicle breast reductions with inverted T



**Figure 2:** Partial nipple loss



**Figure 3:** Bottoming-out

scars. Our results confirmed those in the literature (21,22), which consider inferior pedicle procedures safe and reliable regardless of the degree of parenchymal resection. However, potential disadvantages highlighted by our study include long incision scars as well as skin necrosis and dehiscence at the inverted T base in some cases.

### Discussion

Body contouring often involves multiple steps to achieve satisfactory results (23). Several techniques have been recently introduced for the treatment of various problem areas in the upper body of women with a history of massive weight loss (24), especially for reshaping the breast (25,26). Many women with excessive macromastia (>500 gm per breast by the Schnur Scale) (27), or gigantomastia (>1,000 gm per breast), have an altered self-image and often suffer from low self-esteem and other psychological stress (5). Breast reduction reduces and reshapes large breasts, improving their size, shape and symmetry. Reduction mammoplasty aims to create

proportionate (28), youthful-looking breasts with minimal scars, while maintaining the capacity for breastfeeding and preserving normal sensation. Numerous reduction mammoplasty techniques have been described, including free nipple-areola grafting (13), a variety of nipple-pedicle techniques, and adjunctive liposuction (29,30). All techniques leave scars on the breast around the NAC, usually in either an "anchor" or a vertical design. Technique selection should be based on the surgeon's training and expertise.

Previous studies focused on the common complications associated with reduction mammoplasty (21,31,32). The most common complication associated with the inferior pedicle technique is necrosis at the apical closure with wound dehiscence (21); this depends on various factors but, most importantly, on wound infection and tension of the wound edges. Evidence indicates that perioperative antibiotics may reduce the risk of infection associated with reduction mammoplasty (33). The management options for wound dehiscence are limited, but healing by sec-



**Figure 4:** Breast Asymmetry

ondary intention is suitable for small areas of dehiscence along the edge flap (33). Others (34) have reported performing conservative surgical debridement of small amounts of devitalized tissue, and still others have reported the use of a Hydrofiber dressing with silver (35), or the use of negative pressure therapy (36).

Hematoma and seroma are two common complications after breast reduction, occurring in about 1–2% of cases, especially with inverted T skin resection patterns (37,38). Seromas usually appear later and aspirations can be considered. The frequency of hematomas can be decreased by careful hemostasis and using drains. Nipple necrosis is a dramatic complication, for both the surgeon and the patient. It is a dreaded and, fortunately, rare potential complication of every pedicled breast reduction procedure (1% of cases) (7, 39). It usually occurs in the setting of a large breast reduction (>1000 g resected tissue), in which the pedicle becomes folded and compressed, resulting in decreased circulation. Colombo et al. (40) suggested the use of diagnostic imaging consisting of preoperative MRI and preoperative and intraoperative ultrasound with color Doppler as the only way to completely eliminate the risk for NAC necrosis. Several techniques have been developed for NAC reconstruction. Local flaps are the best choice when local tissue has a good vascularization, sufficient thickness, and it has not been irradiated (41). Double-pedicle subdermal flaps are particularly effective for adding bulk to the nipple and increasing the chance of flap survival since they augment the blood supply (41). Grafts of different thickness, mostly taken from the contralateral NAC, are used when there is a paucity of local soft tissue or the vascularization has been compromised by irradiation, or by breast reconstruction (41). Internal silicone nipple prosthesis, autologous cartilage and alloplastic material implants are all reconstructive alternatives which can provide a permanent nipple projection, even if their use should be accurately planned due to their higher incidence of side effects (41). Areolar tattooing can

be performed both pre-operatively and post-operatively to obtain an optimal NAC pigmentation; it is also a reconstructive, two-dimensional technique which creates a three-dimensional realistic NAC illusion and should be performed in patients who do not want to undergo any other surgery (41).

Scar hypertrophy is common after inferior pedicle breast reduction in its inframammary portion (42). It can be treated with intralesional steroid injections and silicone gel sheets. Asymmetries following breast reduction also occur; contour asymmetries with dog-ears, asymmetric nipple–areola positions, and loss of shape with bottoming-out are the most frequent. Liposuction is a great treatment to correct small asymmetries like dog-ears, or as an adjunct in reducing the volume of a previously operated breast (43). Larger asymmetries need surgical revision after at least 6 months (44). The inframammary fold is an important landmark in the female breast. Creation of a well-defined inframammary fold in breast reduction is a fundamental element in obtaining a good aesthetic result (45).

### Conclusion

Breast reduction is a basic plastic surgery technique performed to improve the physical, social and psychological effects of macromastia. Reduction mammoplasty is associated with excellent patient satisfaction levels. However, complications may occur even in the most suitable candidates, as they are quite frequent. The inverted T, inferior pedicle breast reduction is a very flexible technique that is adaptable to most breast sizes, but, unfortunately, is accompanied by a relatively high complication rate.

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