Management of Recurrent Symptomatic Macromastia: A Single Surgeon’s Experience

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Abstract

Background: Breast reduction for symptomatic macromastia can have excellent long-term results and relief of symptoms. However, patients may require a re-reduction for recurrent symptoms. Previous reports of re-reduction after a primary inferior pedicle reduction have called into question the safety of blood supply to the nipple-areola complex with re-reduction.

Objectives: To examine a single surgeon’s experience and management of recurrent symptomatic macromastia after inferior pedicle breast reduction.

Methods: A retrospective review was performed of a single surgeon’s breast reduction experience using billing data to identify cases of breast re-reduction from January 2003 and January 2018. Breast re-reduction was performed either with a Wise pattern, inferior pedicle or with a smile reduction with an inferior pedicle. Liposuction was used in re-reductions only.

Results: In 15 years, 3530 breast reductions were performed in 1758 patients. In 7 patients, 14 total re-reductions were performed, including 13 secondary breast re-reductions (12 bilateral, 1 unilateral) and 1 tertiary, unilateral breast re-reduction. Seven Wise pattern, inferior pedicle and 7 smile reductions with inferior pedicle procedures were done at the breast level. This translates to a re-reduction incidence of 1 in 250 or 0.4% rate of re-reduction at the patient level in our practice. The minor complication rate was 14% (1 seroma), and the major complication rate was 0%. There were no instances of partial or complete nipple-areola complex necrosis.

Conclusions: Recurrent symptomatic macromastia can be managed with re-reduction with re-creation of the inferior pedicle or a smile breast reduction as we describe without increased risk to nipple-areolar complex viability.

Level of Evidence: 4

Breast reduction remains a top 10 plastic surgery procedures for women with high levels of satisfaction based on patient-reported outcome questionnaires for symptomatic macromastia. There are, however, a subset of patients who may require a secondary or even tertiary breast reduction or “re-reduction” several years out from their initial surgery, despite research that shows volume of resection is not associated with relief of symptoms. We define breast re-reduction as the removal of additional breast tissue with preservation of a pedicle nipple-areola complex in a breast that has been previously reduced, as defined by other authors on this topic. The most feared complication is the loss of the nipple-areolar complex (NAC). Matters can be

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complicated for the surgeon who did not perform the primary reduction or who does not have access to original operative reports to know the pedicle to the NAC.

A limited number of studies have looked at techniques and complications for breast re-reduction, including the dilemma of how to address maintaining blood supply to the NAC when the primary pedicle is unknown. These series have included using the vertical technique with a superior pedicle when the primary pedicle was unknown and even re-creation of the inferior or other pedicles when the primary pedicle was known.\(^2\) Algorithms for addressing recurrent breast reduction have been proposed elsewhere.\(^3\)

In a survey of American Society for Aesthetic Plastic Surgery members, 56% of respondents only used an inferior pedicle breast reduction technique.\(^4\) Despite agreeing that limited or vertical breast reduction techniques were likely to be adopted, the majority of surgeons stated that they did not anticipate on changing their technique. Hence, there is a high likelihood that should a woman desire a re-reduction, she may have had an inferior pedicle breast reduction. When Patel et al looked at re-reductions of inferior pedicles, they concluded, “on the basis of our data, if an inferior pedicle technique was known to have been used for the primary procedure, and an inferior pedicle is used for the repeated procedure, there is 100 percent complication rate.”\(^5\) Because there were no complications in the free nipple grafting patients, they suggested that free nipple grafting should be the “technique of choice for repeated bilateral reduction mammoplasties.”\(^6\)

The commonality of inferior pedicle breast reductions and high reported complication rate was an impetus to look at our series of breast re-reductions as we hypothesized a lower complication rate. Free nipple grafting eliminates the chance to preserve sensation and breastfeeding capabilities to the patient and are possible reasons to maintain a pedicle. The senior author’s experience with outpatient breast reduction and laser-assisted breast reduction has been previously reported.\(^7\)

While it may seem intuitive that the safest option in re-reduction is to recreate the prior pedicle, to our knowledge, limited single-surgeon experiences have been reported. The goal of the present study was to examine the incidence of breast re-reduction in a single surgeon’s 15-year experience of consecutive primary breast reduction cases. We explore the surgeon’s technique and outcomes with preservation of the primary inferior pedicle either with re-creation of the pedicle or a smile breast reduction technique.

**METHODS**

All patients undergoing bilateral breast reduction from January 2003 and January 2018 were identified using the Current Procedural Terminology code 19318 for reduction mammaplasty with a 50 modifier performed by the senior author (W.G.S.). A total of 1758 patients who underwent a total of 3530 breast reductions were identified. Patients who underwent breast re-reduction were identified based on billing data for 19318 performed on separate dates. A retrospective review of all identified cases was performed in accordance with the Declaration of Helsinki. A total of 7 patients were identified as undergoing a secondary reduction; of which, one patient had a tertiary reduction as well. All breast re-reductions were performed by the senior author. Patient demographics, indications for procedure, surgical technique at the time of primary, secondary and/or tertiary reductions, specimen weights, and complications were collected and analyzed. Minimum postoperative follow-up was 6 months. Charts were assessed for major and minor complications as defined and previously published by the senior author.\(^11,12\) Minor complications were defined as seroma, hematoma, infection, dog ear revision, and delayed wound healing of less than 2 cm. Major complications were defined as delayed wound healing of greater than 2 cm, nipple-areolar necrosis, need for transfusion, deep vein thrombosis/pulmonary embolism, myocardial infarction, and death. Statistical significance between comparison groups (primary and secondary reductions) was tested using a two-tailed Student \(t\)-test, where \(P\) value less than 0.05 was considered statistically significant.

All primary and re-reduction surgeries were performed at a single outpatient surgical facility with American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF) certification. All patients underwent a primary bilateral Wise pattern, inferior pedicle laser-assisted breast reduction as previously described by the senior author.\(^12\) Briefly, the breasts were tumesced with 250 cc normal saline solution containing 30 mL of 2% lidocaine and 1 mg of epinephrine. Before prepping, using standard laser safety precautions, inferior pedicle de-epithelialization was performed with a carbon dioxide laser. After prepping, formal dissection of an inferior pedicle and excision of breast tissue was performed with a no. 10 scalpel blade. After hemostasis, closure was obtained in the standard fashion. No patients in this series had drains placed. Patients were all sent home and standard follow-up was maintained. No patients had liposuction of the breast performed at the time of primary reduction.

Re-reduction, either secondary or tertiary, was performed using one of the two techniques. For patients who needed NAC repositioning in addition to needing removal of breast tissue or those patients who had both horizontal and vertical excess of skin, a standard Wise pattern, inferior pedicle breast reduction was carried out again. The nipple was marked at the level of the inframammary fold. For patients who had evidence of pseudoptosis, recurrent symptomatic macromastia and did not need NAC reposition, a horizontal excision of skin and breast tissue along the inframammary fold was performed.
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making sure not to excise tissue within 5 cm of the breast meridian where the inferior pedicle was thought to be. This is similar to a “smile” mastopexy but differs in that it leaves the inferior pedicle parenchyma and referred to by the authors as a “smile reduction with inferior pedicle” (Figure 1). Markings were made along the inframammary crease and a pinch test was used to estimate the amount to be removed; nipple to inframammary crease distance was set between 5 and 6 cm for the smile reductions. The area within 5 cm of the breast meridian was marked and again, this area only was de-epithelialized to maintain where the 4th intercostal was thought to be. Areas lateral and medial to this were excised full thickness down to pectoralis fascia. Liposuction was used in re-reduction cases only in cases where patients had excess lateral or bra line fullness.

RESULTS

In total, 1758 consecutive patients underwent 3530 breast reductions for symptomatic macromastia between January 2003 and January 2018. Of the 3530 breast reductions, 3516 primary reductions were performed, which were all bilateral, and 14 re-reductions were performed at the breast level (Table 1). The mean follow-up for patients in this series was 51 months (range, 6-167 months).

Patients who had re-reductions underwent their primary breast reduction between 2004 and 2017 by the senior author. Patients were all female with an average age of 34 years (range, 18-47 years) with a mean BMI of 24.8 kg/m² (range, 21.9-29.6 kg/m²). All patients had a Wise pattern, inferior pedicle laser-assisted breast reduction with an average of 781 g removed total per patient (range, 180-1195 g). On average, 390 g was removed from the right breast and 391 g was removed from the left breast, which was not significantly different at the breast level (P < 0.80).

Seven patients underwent a total of 14 re-reductions at the breast level. The indication for all re-reductions was symptomatic macromastia, with one patient who had unilateral breast growth and resultant asymmetry. Six patients had bilateral re-reductions and 1 patient had a unilateral secondary and also a unilateral tertiary reduction leading to 14 re-reductions total in this series. Thirteen secondary reductions and 1 tertiary reduction was performed at the breast level. This translates to a re-reduction incidence of 1 in 250 or 0.4% rate of re-reduction at the patient level for our practice.

The average time to secondary reduction was 45 months (range, 11-161 months). The mean BMI at the time of re-reduction was 26.4 kg/m² and was not significantly different from the BMI at the time of primary reduction (P < 0.35). Seven breasts had secondary reductions with a Wise pattern, inferior pedicle. Seven breasts had secondary reductions with a smile reduction, maintaining the inferior pedicle (Figure 2). One patient had a secondary right-sided smile reduction with inferior pedicle and a left-sided Wise pattern, inferior pedicle reduction. One patient had a tertiary unilateral Wise pattern, inferior pedicle reduction.

On average, 462 g of breast tissue was removed total per patient (range, 100-1013 g) which was significantly less than at the time of primary reduction (P < 0.03). On average, 147 g (range, 0-379 g) from the right breast and 166 g (range, 56-337 g) from the left breast, which was not significantly different at the breast level (P < 0.31). On average, 79 cc liposuction from the right breast (range,
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One patient had a tertiary reduction performed 16 months after her secondary reduction and 109 months after her primary reduction. This patient had repeat unilateral growth of breast tissue leading to symptomatic macromastia and asymmetry. Her BMI was 21.1 at the time of tertiary reduction, which was stable from prior, and an additional 250 g of breast tissue was removed from the left breast using a Wise pattern, inferior pedicle technique.

Only one patient had a minor complication of a unilateral seroma that required in-office percutaneous drainage leading to a minor complication rate of 14%. No patients experienced a major complication, and no patients had partial or full NAC necrosis.

### DISCUSSION

Breast reduction for symptomatic macromastia is a commonly performed operation with high levels of patient satisfaction and relief of symptoms. Over the course of a patient’s and a surgeon’s lifetime, it is possible that a woman may seek a breast re-reduction. Our goal was to review a single surgeon’s experience with breast reduction for symptomatic macromastia and evaluate the frequency of re-reduction and outcomes in our practice. Previous reports of re-reduction of inferior pedicle breast reductions have high rates of complications and suggest doing free nipple grafting instead of re-creating the inferior pedicle. While it may seem intuitive that re-creating the same pedicle is the safest option in breast re-reduction, evidence supporting this intuition is limited. Our goal was to review our experience with management of recurrent symptomatic macromastia after a primary Wise pattern, inferior pedicle breast reduction. Preservation of the NAC on a pedicle could give the chance of preserving nipple sensation and potentially breastfeeding in select women.

In the senior surgeon’s 15-year experience of over 3500 primary breast reductions, we found a likelihood of re-reduction of 0.4% based on the methodology of using billing data for this practice alone (as described in the Methods section). We acknowledge that a major limitation is that we are unable to identify the case of re-reduction in patients that may have gone elsewhere for management of recurrent symptomatic macromastia. The indication for re-reductions in this series was recurrent symptomatic macromastia. Changes in BMI were not significantly different, making weight gain unlikely to be the cause of re-reduction in our experience. One patient had a secondary and tertiary reduction for unilateral symptomatic macromastia. She did not meet the criteria for juvenile breast hypertrophy and her pathology showed no suspicious findings and was the only case of a tertiary reduction.

In general, we found that at the time of secondary reduction, the total amount of breast tissue was significantly less than the first reduction. Liposuction was also used in select cases in the secondary reduction but not in the primary reduction, particularly when residual lateral or axillary tissue was the targeted area of removal. The authors agree with previous reports that liposuction likely allows for discontinuous removal of breast tissue likely reducing the likelihood of disrupted blood supply. However, we also believe that the low rate of wound healing complications and lack of any wound healing issues in secondary or tertiary breast reductions are due to the

**Table 1. Patient Characteristics and Surgical Data**

| Characteristic                        | Value (range)          |
|--------------------------------------|------------------------|
| Mean age, y                          | 34 (18-47)             |
| Mean follow up, mo                   | 51 (6-167)             |
| Mean BMI at primary reduction, kg/m² | 24.8                   |
| Mean BMI at secondary reduction, kg/m²| 26.3                   |
| Primary reduction (at breast level)  |                        |
| Wise-pattern, inferior pedicle       | 14                     |
| Right, g                             | 390 (90-569)           |
| Left, g                              | 390 (90-626)           |
| Total, g                             | 780 (180-1195)         |
| Total number of re-reductions (at breast level, including secondary and tertiary reductions) | 14 |
| Secondary reduction (at breast level)|                        |
| Wise-pattern, inferior pedicle       | 6                      |
| Smile reduction, inferior pedicle     | 7                      |
| Right, g                             | 147 (0-379)            |
| Right lipoaspirate, cc               | 79 (0-500)             |
| Left, g                              | 166 (56-337)           |
| Left lipoaspirate, cc                | 71 (45-400)            |
| Total, g                             | 462 (100-1013)         |
| Tertiary reduction (at breast level) |                        |
| Wise-pattern, inferior pedicle       | 1                      |
| Smile reduction, inferior pedicle     | 0                      |
| Complications                        |                        |
| Seroma                               | 1                      |
| Partial NAC necrosis                 | 0                      |
| Complete nipple necrosis             | 0                      |

0-500 cc) and 71 cc from the left breast (range, 0-400 cc) was performed, which was not significantly different at the breast level ($P < 0.65$).
delay phenomenon that happens from the first surgery. Additionally, a tumescent technique is used in re-reductions which may contribute to decreased wound healing issues. However, meticulous dissection of the inferior pedicle and maintenance of the tissue within 5 cm of the meridian of the breast is key. This ensures that the fourth intercostal perforator to the inferior pedicle is not disrupted, whether a full inferior pedicle Wise pattern dissection is done or a smile breast reduction, leaving the inferior pedicle intact.

The decision to perform a Wise-pattern inferior pedicle or smile breast reduction leaving the inferior pedicle intact was based on the estimated amount of resection needed and whether the NAC needed to be corrected. In patients who did not need NAC repositioning, a smile breast reduction allowed for removal of skin and tissue in the transverse dimension, leaving the inferior pedicle intact. Recreation of the Wise-pattern inferior pedicle dissection allowed for more removal from all areas of the breast. Liposuction can be used as an adjunct method of breast tissue removal, particularly in the lateral and axillary areas.

In patients who need removal of tissue but do not need NAC repositioning, the smile breast reduction offers an alternative to the full dissection and re-creation of an inferior pedicle for re-reduction. It may minimize wound healing complications and disrupted blood supply to the NAC because it does not involve incisions along the existing NAC. This may not only preserve the fourth intercostal perforator in the technique we described in the Methods section, but also may preserve collateral blood flow that traverses the existing scars around the NAC.

No cases of partial or full NAC necrosis were experienced by patients in this series. In our experience, if the NAC needs to be repositioned and more breast tissue needs to be removed, re-creation of the inferior pedicle was safely done without major complications. If the NAC does not need to be repositioned and more breast tissue needs to be removed, a reasonable alternative in our experience is the smile breast reduction. This not only preserves the fourth intercostal perforator but also minimizes unnecessary incisions around the NAC. We have found that if the NAC does not need to be repositioned, it is not necessary to just redo the initial Wise pattern, inferior pedicle breast reduction but rather do the smile reduction.

The Wise-pattern inferior pedicle breast reduction technique remains a popular breast reduction technique. Indeed, breast reduction is a core plastic surgery procedure even for trainees who are required to have a minimum number of breast reduction surgeries prior to graduation. Not all of these plastic surgeons will go on to do advanced aesthetic surgery and may be more likely to perform Wise-pattern inferior pedicle breast reduction, which has historically been the most popular technique of surveyed plastic surgeons. Hence, it may be of value for trainees to know that two options with the inferior pedicle exist for the management of recurrent symptomatic macromastia after a primary Wise pattern, inferior breast reduction: recreation of the inferior pedicle in a redo Wise-pattern inferior pedicle reduction or a smile breast reduction with an inferior pedicle. Repeat reduction with free nipple grafting also remains an option.
We had a minor complication rate of 14% in one patient who after a secondary reduction had a seroma that resolved with serial aspirations. This complication rate is similar to the minor complication rate previously reported of 14% by the senior author.11 There were no major complications in this series.

A discussion of nipple sensitivity after breast reduction is beyond the scope of the present study but has been explored in greater detail elsewhere.14 Anecdotally, we found that patients after re-reduction using the techniques we described maintained some level of nipple sensation at follow-up. For patients in whom an attempt at preservation of nipple sensation is important, re-reduction using the techniques we described could potentially give a chance at nipple sensation preservation vs free nipple grafting which eliminates any possibility of nipple sensation.

There are a number of limitations to the present study. The study was designed to use billing and procedural codes to identify cases of re-reduction and hence the rate of re-reduction is limited to our series alone and using the methodology described. It is possible patients underwent re-reduction elsewhere. Additionally, the goal of the present study was to examine instances, clinical features, and outcomes in patients who underwent re-reduction. Hence, outcomes for all patients who underwent a primary Wise-pattern inferior pedicle reduction is beyond the scope of the present study, but smaller series by the senior surgeon have been described elsewhere.10-12

Access to billing data limited the number of years that we were able to search for the purposes of the study though the senior author has been performing breast reductions for over 30 years in practice. Though the author has also published on his experience with superior pedicle breast reductions, there were no cases of re-reductions with superior pedicles. The billing data search did not allow for searching of the pedicle used in each procedure and therefore we were unable to make comparisons of re-reduction rates based on pedicle for the senior author. Alternative approaches to breast re-reduction have been described elsewhere in the literature.3-7 The purpose of the present study was not to compare approaches to re-reduction and therefore such comparisons are not presented.

CONCLUSION

After a primary Wise-pattern, inferior pedicle breast reduction for symptomatic macromastia, patients in our retrospective study successfully underwent re-reduction with re-creation and preservation of the inferior pedicle without vascular compromise to the NAC using the techniques we described.

Disclosures

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