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ORIGINAL ARTICLE
Breast

Evaluating Patient-reported Outcomes after Bilateral Reduction Mammoplasty: A Comparison of Reduction Techniques at a University Hospital

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Background: Macromastia, defined as the abnormal enlargement of breasts, burdens individuals physically and psychologically, impacting their daily lives beyond aesthetics. Reduction mammoplasty offers relief by restoring proportional breast volume and appropriate contour. Surgical success relies on choosing a suitable individualized operative technique tailored to the patient's presentation and postoperative goals. This study examines postoperative, patient-reported outcomes across different reduction techniques to gauge the impact of reduction technique on overall patient perspective of aesthetic and functional satisfaction.

Methods: A retrospective review identified reduction mammoplasty patients by a single surgeon between 2018 and 2022. Exclusion criteria included augmentation-related or cancer reconstructive procedures. Phone interviews were conducted using a survey adapted from BREAST-Q to assess postoperative outcomes in patients. Data analysis included Pearson chi-square test in STATA 16.1.

Results: Among 155 patients identified, 64 completed the survey. Average postsurgical interval was 24 months postoperative. After stratifying patients by operative technique, there was no significant difference in postoperative satisfaction among the cohorts with regard to nipple and breast appearance, sensation, symmetry, or shape.

Conclusions: This study highlights no significant disparity in perceived aesthetic or functional outcomes among different reduction mammoplasty techniques. Personalized considerations, such as patient factors, surgical expertise, and anatomical specifics, should guide technique selection, emphasizing individualized approaches over presumed superior methods for optimal results. *(Plast Reconstr Surg Glob Open 2024; 12:e5920; doi: 10.1097/GOX.0000000000005920; Published online 19 June 2024.)*

INTRODUCTION

Macromastia, a condition characterized by the excessive growth of breast tissue, can profoundly affect the physical, emotional, and social aspects of an individual's life.[1–3] The weight and size of overly large breasts pose significant physical challenges. Chronic neck, shoulder, and back pain occur due to the disproportionate anterior strain on the body's musculoskeletal structure, often leading to limited mobility.[2] Skin complications, such as irritation, rashes, and sores, can develop beneath the breast due to constant friction, moisture, and bra straps digging into the skin, leaving painful indentations.[4] These physical discomforts can disrupt sleep, limit participation in physical activities, and impact daily functioning.[5] The emotional toll of macromastia is substantial, affecting self-esteem, body image, and mental health.[3] Social interactions may become daunting, as individuals may feel self-conscious or experience unwanted attention due to the conspicuousness of their breasts. Finding appropriately fitting clothing that accommodates larger breast sizes can be challenging, exacerbating frustration and emotional strain. The cumulative effect of these challenges can lead to anxiety, depression, and a diminished quality of life.[3,5]

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Received for publication March 28, 2024; accepted May 4, 2024.

DOI: 10.1097/GOX.0000000000005920

Disclosure statements are at the end of this article, following the correspondence information.

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In many cases, surgical intervention with breast reduction, or mastectomy, becomes a necessary option to alleviate the symptoms of macromastia. Surgery can offer relief from pain while also restoring confidence and mobility. Surgical interventions ultimately improve the overall well-being of individuals affected by macromastia.[4,6]

Breast reduction surgery encompasses various techniques. Two important considerations in operative planning include incision pattern and pedicle type. Commonly used incision patterns include the Wise pattern, vertical incision, and periareolar incision techniques. The role of the pedicle in breast reduction is to provide blood and nerve supply to the nipple–areolar complex (NAC) through the use of a de-epithelialized dermoglandular pedicle. There are many choices of pedicle direction, each with their own unique considerations. The inferior pedicle technique involves repositioning the NAC while removing excess breast tissue from the medial, lateral, and superior breast. This pedicle relies on the blood supply from the fourth, fifth, and sixth perforators from the internal mammary artery. Additionally, this method preserves nipple sensation (anterolateral fourth intercostal nerve) and breastfeeding ability. Of note, this technique has the potential to create a more squared breast shape and bottoming out effect, especially when removing greater than 2500 g.[7–9] The medial pedicle method involves tissue removal from the central and lateral breast area, preserving the nipple's blood supply from medial perforators usually from the third to sixth intercostal space. Advantages of this technique include maintaining nipple sensitivity and reduced risk of complications, and disadvantages include limited breast projection and suboptimal breast shape.[10–13] The superomedial pedicle technique combines aspects of the superior and medial techniques. The superior pedicle technique involves tissue removal from the inferior, medial, and lateral breast, which retains the nipple's superior supply, notably the pectoral branch of the thoracoacromial artery. Advantages of this technique include maintaining nipple sensation and breastfeeding ability, but disadvantages may include more visible scarring.[14–16] Free nipple graft technique involves complete removal and reattachment of the NAC, suitable for extremely large reductions. This technique allows for a more effective size reduction; however, the patient will experience loss of NAC sensation, inability to breastfeed, and increased risk of nipple necrosis due to reduced blood supply.[17–19] Therefore, the choice of technique depends on various factors, including breast size, shape, breast surgical history, and patient preferences,

To date, comprehensive studies directly comparing patient-reported outcomes among various breast reduction techniques are notably scarce. Understanding the nuanced differences in postoperative outcomes, including patient satisfaction, functional improvement, complications, and aesthetic outcomes, among patients undergoing breast reduction with varying pedicle techniques is essential. This study aims to bridge this gap by investigating the association between different pedicles for reduction and their respective impacts on patient-reported outcomes.

Takeaways

Question: Are certain pedicles used within breast reduction associated with greater patient-reported satisfaction?

Findings: Patients do not have a higher level of satisfaction with their surgical outcomes when controlled by pedicle. This includes shape, sensation, and symmetry of the breast along with the placement, symmetry, and projection of the nipple-areolar complex.

Meaning: Providers should focus on using a pedicle that they are most comfortable utilizing for a breast reduction. These findings can help guide physicians with their pre-operative planning and minimizing potential complications.

METHODS

A retrospective chart review was conducted to identify patients who underwent reduction mammoplasty by a single surgeon between 2018 and 2022 at a single academic institution. Exclusion criteria included patients with any procedures that were associated with augmentation or cancer-related reconstructive surgery. Phone interviews were conducted with patients by employing a 35-question survey adapted from BREAST-Q to assess various aspects of postsurgical outcomes and satisfaction including NAC placement, appearance, sensation, pigmentation, and projection, as well as breast shape and size. (**See appendix, Supplemental Digital Content 1**, which shows the full survey adapted from BREAST-Q to collect perspectives of postsurgical outcomes and satisfaction for NAC placement, appearance, sensation, pigmentation, and projection, as well as breast shape and size. **http://links.lww.com/PRSGO/D311**.) Attempts were made to contact each patient by phone three times before being designated as lost to follow-up. Patient results were analyzed via Pearson chi-square test within STATA 16.1 to determine if any surgical method had higher correlations with certain postoperative complications and overall patient satisfaction. Statistical significance was designated at a P value of less than 0.05.

RESULTS

This study identified 155 patients who underwent bilateral reduction mammaplasty. Of the 155 patients, 62 (40%) completed the questionnaire. The median interval at which the questionnaire was administered was 24 months postoperatively (range: 5.5–43.4 mo). There was no statistical difference in demographics or reduction technique between respondents and nonrespondents ($P = 0.73$).

The mean age at time of bilateral breast reduction was 38.61 years (range: 17–73 y). The mean body mass index was 35.9 kg/m^2 (range: 23.8–58.3 kg/m^2). Both age and body mass index were not associated with a reduction technique ($P = 0.44$). With regards to smoking, 12.9% of patients were either current or former smokers when presenting to their initial consultation. The mean cumulative resection weight was 2014 g (range: 362–7500 g). The most common pedicle used was medial (45.16%, 28), followed by inferior (27.42%, 17), superior medial (16.13%, 10),

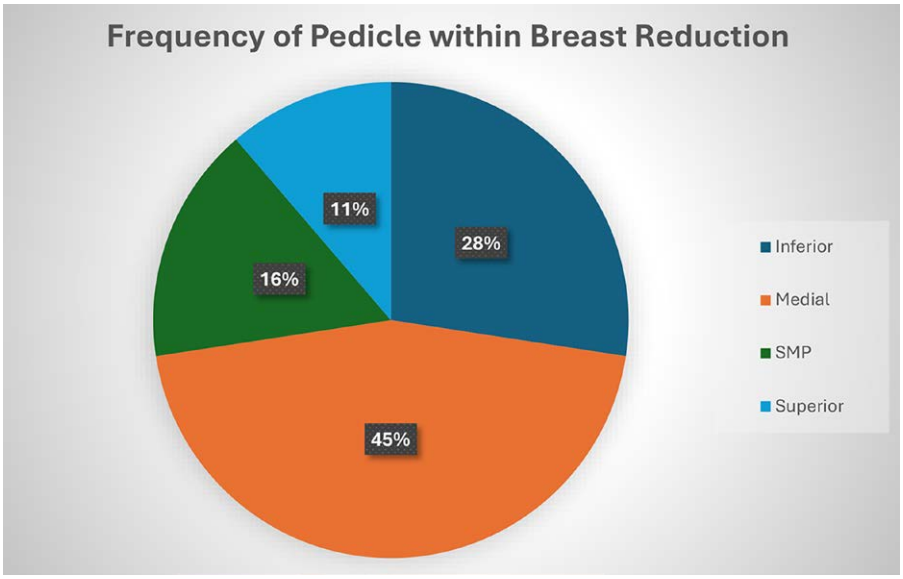

Fig. 1. Frequency of pedicle within surgical technique for breast reduction. SMP, superomedial pedicle.

Table 1. Chi-square Output Analyzing Surgical Technique with Satisfaction in NAC Placement, Symmetry, and Projection

Variable 1 (Independent Variable)	Variable 2 (Dependent Variable)	Degrees of Freedom	Sample Size	Chi-square Statistic Value	*P*
Surgical technique	Satisfaction NAC placement	12	62	18.913	0.091
Surgical technique	Satisfaction NAC symmetry	12	62	9.2198	0.684
Surgical technique	Satisfaction NAC projection	12	62	12.287	0.423

Table 2. Chi-square Output Analyzing Surgical Technique with Satisfaction and Change in Nipple and Areola Sensation

Variable 1 (Independent Variable)	Variable 2 (Dependent Variable)	Degrees of Freedom	Sample Size	Chi-square Statistic Value	*P*
Surgical technique	Satisfaction nipple sensation	12	62	6.444	0.892
Surgical technique	Change nipple sensation	12	62	12.2544	0.425
Surgical technique	Satisfaction areola sensation	12	62	11.8691	0.456
Surgical technique	Change areola sensation	12	62	12.1835	0.431

and superior (11.29%, seven) (Fig. 1). Resection weight was not associated with the type of pedicle utilized (P = 0.47). All patients underwent a Wise pattern skin incision. For complications, 36.6% of respondents had postsurgical complications, with the most common being wound dehiscence (50%) and hypertrophic scarring (22.7%). Frequency of postsurgical complication was not associated with reduction technique (P = 0.74).

The Pearson chi-square test found that the reduction technique used was not associated with greater patient satisfaction with regards to cosmetic appearance of the breasts or NAC. There was no association between the type of pedicle used for reduction and satisfaction with NAC placement, NAC symmetry, or NAC projection (Table 1). Surgical technique was not associated with change in nipple or areolar sensation. There was also no difference in satisfaction with nipple or areolar sensation (Table 2). Of the total patients, 54.85% stated that they had either an increase or decrease in nipple sensation, whereas 46.77% stated they had either an increase or decrease in areola sensation. Only 35.48% of patients stated they did not experience any change in sensation in either their nipples or areolas. Additionally, surgical technique was not associated with increased satisfaction of breast shape, size, or symmetry (Table 3). Surgical technique was also not associated with satisfaction in scar location or breast appearance in either normal clothing or bra only (Table 3). Overall, 80.6% were extremely or moderately satisfied with their breast size, 85.5% were extremely or moderately satisfied with their breast shape, and 85.5% were either extremely or moderately satisfied with their breast symmetry. With regards to expectations, 83.9% reported fulfilled expectations by their respective procedures. Pedicle used did not affect expectation scores (Table 3). With regards to satisfaction, 74.2% of patients were extremely satisfied with the results of their procedure based on their preoperative consultations and conversation with the plastic surgeon.

Postoperative breast symmetry was designated as extremely or very important by 82.2% of patients. Additionally, 67.7% reported that postoperative NAC sensation was extremely or very important. Reduction

Table 3. Chi-square Output Analyzing Surgical Technique with Satisfaction of Breast Shape, Size, and Symmetry along with Satisfaction of Scar Location, Appearance in Day Clothing, and Appearance in Bra Only

Variable 1 (Independent Variable)	Variable 2 (Dependent Variable)	Degrees of Freedom	Sample Size	Chi-square Statistic Value	*P*
Surgical technique	Satisfaction breast shape	12	62	9.9159	0.623
Surgical technique	Satisfaction breast size	12	62	10.8	0.546
Surgical technique	Satisfaction breast symmetry	12	62	14.0976	0.295
Surgical technique	Expectations breast reduction	12	62	7.8346	0.798
Surgical technique	Satisfaction surgical scars location	12	62	14.9111	0.246
Surgical technique	Satisfaction breast appearance in day clothing	12	62	7.0603	0.854
Surgical technique	Satisfaction breast appearance in bra-only	12	62	12.3268	0.42

In addition, chi-square output analyzing meeting expectations of surgery by reduction technique.

Table 4. Chi-square Output Analyzing Surgical Technique with Overall Satisfaction with Surgical Outcome and Patient's Likelihood to Recommend the Procedure

Variable 1 (Independent Variable)	Variable 2 (Dependent Variable)	Degrees of Freedom	Sample Size	Chi-square Statistic Value	*P*
Surgical technique	Satisfaction with overall surgical outcome	12	62	13.1736	0.589
Surgical technique	Procedure recommendation	12	62	7.886	0.794

technique did not affect satisfaction with breast symmetry or NAC sensation (Table 4). There was no association with pedicle used and rate of referral for breast reduction (Table 4).

DISCUSSION

Examining patient-reported outcomes after reduction mammoplasty helps understand the impact of different surgical techniques on patient outcomes and satisfaction and may influence practice patterns. Despite studies highlighting the advantages of the varying techniques, many surgeons often utilize the one or two with which they have the most experience.

On multivariable analysis when controlling for surgical technique, there were no statistically significant differences among the 15 postoperative outcomes studied. Despite the importance of these concerns when it comes to advantages and disadvantages by pedicle utilized, this multifaceted analysis failed to unveil any pronounced disparities in patient-reported outcomes among different pedicle techniques across various dimensions. The only variable near statistical difference was satisfaction with NAC placement ($P = 0.091$). There was no correlation between pedicle utilized in reduction and total resection weight ($P = 0.47$). This highlights that patients are equally as satisfied when it comes to multiple factors that are utilized within BREAST-Q. Additionally, it highlights that predicted resection weight may not be as important in dictating the use of a specific reduction technique when considering patient satisfaction or outcomes. It is important to note that our patient population held the diagnosis of macromastia or gigantomastia, which is defined in the literature as a breast reduction up to 2000 g per breast.[20] There are data to suggest that certain reduction techniques are more successful for larger breasts, such as in gigantomastia[21,22] In the examined patient population with lower resection weights, the various pedicled techniques are safe and reliable to use. Patients did not perceive a deviation in outcomes by pedicle technique. Largely, there is not a clear difference in patient-reported outcomes when stratified by the reduction technique.

Regarding overall satisfaction with results of their reduction, which encompasses all components within the BREAST-Q, there was no difference when stratified by the pedicle technique. The clear majority were satisfied with their breast size, shape, and symmetry along with their view of their breast in normal clothing and bra only. Inquiry about met expectations revealed that 83.9% of patients stated their expectations were met, and no correlation between satisfaction and type of reduction technique utilized was observed ($P = 0.798$). This highlights that the perceived advantages of each pedicle are not recognized by patients and bear no weight in their satisfaction scores.

An interesting finding from this analysis was the high level of importance patients placed on perceived NAC symmetry and sensitivity. As highlighted in the literature, techniques, such as superior and superior medial techniques, can protect nipple projection and sensitivity.[14–16] This highlights the importance of preoperative conversations between the physician and patient to discern patient goals. As shown in this study, a clear majority were satisfied or extremely satisfied with their results based on their preoperative consultations.

Shared decision-making between a surgeon and their patient is an important part of meeting patient outcome expectations. The main goal of any surgical procedure, especially within macromastia, is to ensure that the surgical procedure is safe and the patient is satisfied with the results. If patients do not have a preference of surgical approach after an informed discussion of the risks and benefits, physician comfort and expertise can guide surgical approach. Research focused on the statistically significant differences between breast reduction techniques and associated outcomes is still needed.

The greatest limitation of this study is the small sample size despite a successful response rate. Second, survey fatigue could have affected patients' responses to questions, as the survey was lengthy, attempting to capture multiple components of BREAST-Q. However, this facility intends to continue to collect this information in a streamlined format, both increasing sample size and decreasing survey fatigue.

CONCLUSIONS

The results reveal that there is no discernible difference in patients' perceived aesthetic outcomes among differing surgical techniques in reduction mammoplasty. This suggests that the choice of technique should not be solely determined by presumed superior aesthetic or functional advantages of a particular technique. Rather, a comprehensive approach considering individual patient goals, surgeon expertise, and specific anatomical considerations should guide the surgical decision-making process. This study underscores the need for personalized approaches in mammoplasty, as no single technique emerges as a clear winner from the patient's perspective in achieving positive surgical outcomes.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

ETHICAL APPROVAL

Institutional review board approval was granted by the University of South Alabama.

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