

Research Article

Evaluation of Reduction Mammoplasty Outcomes in Benign and Malignant Indications: A Single-Center Retrospective Comparative Study

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Abstract

Objectives: Reduction mammoplasty is performed for symptomatic macromastia and breast malignancy, yet direct comparisons between these indications are limited. This study compared their perioperative and oncological profiles and examined the relationship between resection weight and preoperative functional impairment.

Methods: This single-center retrospective study included 63 women undergoing bilateral reduction mammoplasty between July 2020 and July 2026: 42 for benign macromastia and 21 for malignant indications. Demographic, operative, complication, and oncological data were reviewed. Preoperative activity restriction was graded from none to severe. Associations between resection weight, clinical variables, and activity restriction were analyzed.

Results: Groups were comparable in age, body mass index (BMI), weight, smoking, diabetes, resection weight, operative time, and complication rates. Inferior pedicles were more frequent in malignant cases (76.2% vs. 31.0%, $p=0.001$), reflecting tumor location. Overall complication rate was 7.9%, with no nipple–areola complex necrosis or reoperation. Resection weight correlated with BMI ($p=0.51$) and operative time ($p=0.50$; both $p<0.001$) and increased progressively with activity restriction (530–2240 g, $p<0.001$). This association remained significant after BMI adjustment (partial $\rho=0.33$, $p=0.010$).

Conclusion: Reduction mammoplasty showed comparable perioperative outcomes across indications. Greater functional limitation was independently associated with larger resection weight.

Keywords: Breast cancer, macromastia, oncoplastic breast surgery, reduction mammoplasty

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Macromastia causes chronic neck, shoulder and back pain, bra-strap grooving, intertrigo and limitation of physical activity, together with impaired self-esteem and body image.^[1,2] Reduction mammoplasty reliably reverses this symptom complex: a meta-analysis of published series

demonstrated significant improvement in shoulder pain, bra-strap grooving, back and neck pain and intertrigo^[3], and a systematic review and meta-analysis of BREAST-Q outcomes confirmed gains across all quality-of-life domains, with postoperative scores reaching or exceeding

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normative values.^[4] The procedure is consequently one of the most frequently performed operations in plastic surgery, and the number performed continues to rise.^[2]

The operation also carries an oncological dimension at both ends of its indication spectrum. Because every specimen undergoes routine histopathology, reduction mammoplasty occasionally uncovers unsuspected disease. Frank malignancy is rare, but high-risk proliferative lesions are found in a small yet consistent minority of specimens, with reported incidences varying widely between series.^[5–7] The predictors of such findings remain inconsistent: higher body mass index, greater resection weight, family history and older age each have been identified in different cohorts^[5–7], and detection depends heavily on the intensity of pathological sampling, since examining four or more paraffin blocks per specimen substantially increases the yield.^[7] Removal of parenchyma also alters the subsequent oncological trajectory, with population-based data showing a lower long-term incidence of breast cancer after reduction alongside more frequent imaging, more benign biopsies and a greater likelihood of mastectomy when cancer does develop.^[8] Conversely, the same techniques have been incorporated into breast-conserving surgery: in large, pendulous breasts, conventional lumpectomy cannot adequately reduce volume, contralateral symmetrization is unachievable and radiotherapy planning is difficult, whereas reduction mammoplasty addresses all three while permitting resection of larger parenchymal volumes.^[9,10] In this setting the pedicle is selected according to tumor location rather than breast morphology alone.^[9]

Direct comparisons between the two indications remain scarce and have focused almost exclusively on wound complications. Gulcelik et al.^[9] found no difference in complication rates between 286 reductions performed with and without breast cancer, body mass index being the only associated factor, and Morrison et al.^[10] reported comparable complication profiles across 632 oncoplastic, symmetrizing and benign reductions. How the indications compare in pedicle choice, resection volume and operative time, and how resected volume relates to preoperative functional impairment, has received little attention. The present study therefore compared the demographic, surgical, complication and oncological profiles of patients undergoing bilateral reduction mammoplasty for benign versus malignant indications and analyzed the relationships between body mass index, resection weight, operative time and the degree of activity restriction.

Methods

Study Design and Setting

This was a single-center, retrospective, comparative observational study conducted in the department of general surgery of a tertiary training and research hospital. The clinical automation system and the archived medical records of the institution were screened for all patients who underwent bilateral reduction mammoplasty between 1 July 2020 and 31 July 2026, and their data were reviewed retrospectively. The study protocol was approved by the Fatih Sultan Mehmet Training and Research Hospital Scientific Research Ethics Committee (no: 2026-426, date: 12.08.2026). The study was conducted in accordance with the principles of the Declaration of Helsinki. Because of the retrospective design and the use of anonymized routine clinical data, the requirement for written informed consent was waived by the ethics committee. The study received no external funding, and the authors declare no conflict of interest.

Participants

Patients were eligible for inclusion if they had undergone reduction mammoplasty at the study institution, were 18 years of age or older, and had complete operative files and pathology reports available in the hospital archive. Patients with a history of previous major breast surgery and those with incomplete medical records were excluded.

A total of 63 female patients met the eligibility criteria and constituted the study population. Patients were assigned to two groups according to the indication for surgery: those operated on for benign, symptomatic macromastia (benign group, n=42) and those in whom reduction mammoplasty was performed in the setting of a malignant or premalignant breast lesion, either as a therapeutic (oncoplastic) procedure or with contralateral symmetrization (malignant group, n=21). All procedures were bilateral.

Surgical Procedure

All operations were performed by the same surgical team using either a superior pedicle (SPF) or an inferior pedicle (IPF) technique with a Wise-pattern skin resection. In patients operated on for benign macromastia, the pedicle was selected according to the degree of ptosis, the nipple–areola-complex-to-sternal-notch distance and the anticipated resection weight. In patients with malignant indications, the pedicle was determined by the location of the tumor so that the lesion could be included in the resection specimen with adequate margins, and surgery was performed either upfront or after the completion of neoadjuvant systemic therapy. All resected breast tissue was weighed intraoperatively for each side separately and submitted for routine histopathological examination.

Data Collection and Definitions

The following variables were retrieved from the medical records: age, height, body weight, body mass index (BMI), smoking status, presence of diabetes mellitus and other comorbidities, surgical technique (superior versus inferior pedicle), resection weight of the right and left breasts and the total resection weight, and total operative time in minutes. Preoperative symptoms were recorded as back pain, neck pain, shoulder pain, bra-strap grooving and skin irritation/intertrigo. The degree of preoperative restriction of daily activity, as documented in the preoperative clinical assessment, was graded on a four-level ordinal scale as none, mild, moderate or severe.

Postoperative complications were recorded as hematoma, wound dehiscence, surgical site infection, nipple–areola complex (NAC) necrosis and seroma, and were assessed within the first 30 postoperative days. For the malignant subgroup, the following oncological characteristics were additionally recorded: histological type, disease stage according to the American Joint Committee on Cancer TNM staging system, surrogate molecular subtype as recorded in the routine pathology reports on the basis of estrogen receptor, progesterone receptor, HER2 and Ki-67 immunohistochemistry, and the timing of surgery relative to systemic therapy. Ductal carcinoma in situ was classified as stage 0. Patients with no residual invasive tumor in the breast after neoadjuvant therapy were reported separately as ypT0/is. Because the pathology records did not distinguish complete absence of tumor from residual ductal carcinoma in situ, and nodal status was not systematically available, these cases are not designated as a pathological complete response, which requires ypT0/is ypN0. Because malignant phyllodes tumor is not subject to the TNM staging system used for breast carcinoma, this case was presented separately in the stage distribution and was excluded from the molecular subtype analysis; molecular subtype percentages were therefore calculated over the number of invasive carcinomas (n=19).

Statistical Analysis

All analyses were performed with IBM SPSS Statistics (version 27; IBM Corp., Armonk, NY, USA). The distribution of continuous variables was assessed with the Shapiro–Wilk test. Variables that were normally distributed within both groups (age, height, body weight and operative time) are presented as mean±standard deviation, whereas those that departed from normality (body mass index and resection weights) are presented as median (interquartile range, IQR); categorical variables are presented as frequency and percentage (%).

Because several continuous variables departed from normality and the malignant subgroup was small, non-parametric

tests were applied uniformly: the Mann–Whitney U test for continuous variables and Fisher's exact test for categorical variables. Total resection weight and BMI across the four activity-restriction categories were compared with the Kruskal–Wallis test. Relationships between BMI, total resection weight, operative time, age and the ordinal grade of activity restriction were evaluated with Spearman's rank correlation coefficient (ρ). Because BMI was associated with both activity restriction and resection weight, the association between activity restriction and resection weight was additionally examined with a partial Spearman correlation adjusted for BMI and was repeated in the benign group alone as a sensitivity analysis. All tests were two-sided, and a p value below 0.05 was considered statistically significant.

Results

Demographic and Clinical Characteristics

A total of 63 female patients who underwent bilateral reduction mammoplasty were included, comprising 42 patients (66.7%) operated on for benign macromastia and 21 patients (33.3%) operated on for a malignant indication. The mean age of the whole cohort was 51.8±10.3 years (range, 30–78), and the median BMI was 30 (IQR, 28–33; range, 21–48); 32 patients (50.8%) were obese (BMI ≥ 30 kg/m²). Twenty-one patients (33.3%) were current smokers and 6 (9.5%) had diabetes mellitus.

The two groups were comparable with respect to age (50.6±10.3 versus 54.2±10.3 years; $p=0.184$), BMI (median 30 versus 29; $p=0.203$), body weight (83.4±11.6 versus 85.2±9.6 kg; $p=0.470$), smoking (38.1% versus 23.8%; $p=0.396$) and diabetes mellitus (9.5% versus 9.5%; $p=1.000$). The only baseline variable that differed significantly between the groups was height, which was greater in the malignant group (169.2±5.5 versus 164.5±7.4 cm; $p=0.015$). The demographic and clinical characteristics of the cohort are summarized in Table 1.

Preoperative symptoms were documented in 61 of the 63 patients (96.8%); the percentages given below were calculated for the entire cohort (N=63), symptom information being unavailable in the remaining two patients. The most frequently reported complaints were back pain (n=32; 50.8%), neck pain (n=31; 49.2%) and shoulder pain (n=22; 34.9%), followed by skin irritation or intertrigo (n=13; 20.6%) and bra-strap grooving (n=8; 12.7%); most patients reported more than one symptom.

Surgical Parameters

A superior pedicle technique was used in 34 patients (54.0%) and an inferior pedicle technique in 29 patients (46.0%). The distribution of techniques differed markedly

Table 1. Demographic and clinical characteristics

Variable	Entire series (n=63)	Benign (n=42)	Malignant (n=21)	p
Age (years), mean±SD	51.8±10.3	50.6±10.3	54.2±10.3	0.184
BMI (kg/m ²), median (IQR)	30 (28–33)	30 (28–33)	29 (27–30)	0.203
Height (cm), mean±SD	166.0±7.1	164.5±7.4	169.2±5.5	0.015
Weight (kg), mean±SD	84.0±10.9	83.4±11.6	85.2±9.6	0.470
Smoking (+), n (%)	21 (33.3)	16 (38.1)	5 (23.8)	0.396
Diabetes mellitus (+), n (%)	6 (9.5)	4 (9.5)	2 (9.5)	1.000

Mean±SD: Mean±standard deviation; IQR: Interquartile range; BMI: Body mass index.

between the groups: the inferior pedicle was used in 16 of 21 patients (76.2%) in the malignant group but in only 13 of 42 patients (31.0%) in the benign group ($p=0.001$), reflecting the fact that in malignant cases the pedicle was chosen according to the location of the lesion rather than according to breast morphology alone.

The median total resection weight was 1350 g (IQR, 798–1842; range, 380–3900) for the entire cohort, 1435 g (IQR, 890–1900) in the benign group and 1040 g (IQR, 750–1580) in the malignant group; this difference did not reach statistical significance ($p=0.115$). Resection weights were likewise comparable between the groups for the right (median 680 versus 550 g; $p=0.110$) and the left breast (median 692 versus 482 g; $p=0.145$). The mean operative time was 207.3 ± 36.7 minutes and was almost identical in the two groups (207.6 ± 40.3 versus 206.5 ± 28.9 minutes; $p=0.895$). Total resection weight did not differ significantly between the superior and inferior pedicle techniques (median 1350 versus 1283 g; $p=0.620$). Surgical parameters are presented in Table 2.

Complications

Complications occurred in 5 of the 63 patients, corresponding to an overall complication rate of 7.9%. Wound dehiscence was the most common event ($n=3$; 4.8%), followed

by hematoma ($n=1$; 1.6%) and seroma ($n=1$; 1.6%). No surgical site infection and, importantly, no nipple–areola complex necrosis was observed, and no patient required reoperation. The complication rate was numerically higher in the malignant group (3 of 21; 14.3%) than in the benign group (2 of 42; 4.8%), but the difference was not statistically significant ($p=0.323$). The distribution of complications is shown in Table 3.

Oncological Characteristics of the Malignant Sub-group

Of the 21 patients in the malignant group, 19 (90.5%) had invasive carcinoma, 1 (4.8%) had ductal carcinoma in situ and 1 (4.8%) had a malignant phyllodes tumor. Among the 20 patients with breast carcinoma, the most common stage was IIA ($n=8$; 38.1%), followed by stage I ($n=4$; 19.0%), stage IIB ($n=2$; 9.5%) and stage 0 ($n=1$; 4.8%); 4 patients (19.0%) had no residual invasive tumor in the breast after neoadjuvant therapy (ypT0/is) and stage information was unavailable for 1 patient (4.8%). Among the 19 invasive carcinomas, the molecular subtype distribution was HER2-positive in 7 patients (36.8%), luminal A in 6 (31.6%), luminal B in 5 (26.3%) and triple-negative in 1 (5.3%). Surgery was performed upfront in 13 patients (61.9%) and after the completion of neoadjuvant systemic therapy in 8

Table 2. Surgical parameters and complications

Variable	Entire series (n=63)	Benign (n=42)	Malignant (n=21)	p
Technique – IPF, n (%)	29 (46.0)	13 (31.0)	16 (76.2)	0.001
Technique – SPF, n (%)	34 (54.0)	29 (69.0)	5 (23.8)	–
Right-side excision (g), median (IQR)	680 (415–900)	715 (450–946)	550 (360–770)	0.110
Left-side excision (g), median (IQR)	692 (390–925)	730 (440–992)	482 (380–780)	0.145
Total excision (g), median (IQR)	1350 (798–1842)	1435 (890–1900)	1040 (750–1580)	0.115
Operative time (min), mean±SD	207.3 ± 36.7	207.6 ± 40.3	206.5 ± 28.9	0.895
Complications (total), n (%)	5 (7.9)	2 (4.8)	3 (14.3)	0.323

SPF: Superior pedicle; IPF: Inferior pedicle. In malignant cases, the technique was selected according to lesion location.

Table 3. Distribution of complications (entire series)

Type of complication	n	% (n=63)
Hematoma	1	1.6
Wound dehiscence	3	4.8
Infection	0	0.0
NAC necrosis	0	0.0
Seroma	1	1.6

Complications developed in a total of 5 patients (7.9%). No NAC necrosis and no major complication requiring reoperation were observed. NAC necrosis: Nipple-areola complex necrosis.

patients (38.1%). These findings are detailed in Table 4, and the distribution of molecular subtypes is shown in Figure 1.

Correlation Analyses

BMI showed a moderate positive correlation with total resection weight (Spearman $\rho=0.51$; $p<0.001$), and total resection weight correlated moderately with operative time ($\rho=0.50$; $p<0.001$), indicating that larger resections were associated with longer procedures. A weaker but statistically significant correlation was also found between BMI and operative time ($\rho=0.27$; $p=0.036$). In contrast, age showed no correlation with total resection weight ($\rho=0.05$; $p=0.722$). The correlation coefficients are listed in Table 5 and the corresponding scatter plots are shown in Figures 2 and 3.

Activity Restriction and Resection Volume

The degree of preoperative restriction of daily activity was graded as none in 6 patients (9.5%), mild in 29 (46.0%), moderate in 19 (30.2%) and severe in 9 (14.3%). Total resection weight increased progressively across these categories, with median values of 530 g (IQR, 428–689) in patients without activity restriction, 1052 g (IQR, 750–1750) in those with mild restriction, 1350 g (IQR, 1074–1535) in those with moderate restriction and 2240 g (IQR, 1900–3120) in those with severe restriction (Kruskal–Wallis $p<0.001$; Table 6, Fig. 4). Body mass index followed the same gradient, with medians of 26, 29, 30 and 36 kg/m² across the four categories ($p<0.001$), and correlated with the grade of activity restriction ($\rho=0.57$; $p<0.001$). Activity restriction correlated with total resection weight ($\rho=0.52$; $p<0.001$); after adjustment for BMI this association was attenuated but remained significant (partial $\rho=0.33$; $p=0.010$). In a sensitivity analysis confined to the 42 patients operated for benign macromastia, resection weight again increased across the categories (medians 725, 1274, 1380 and 2240 g; $p=0.006$; $\rho=0.45$, $p=0.003$), although after adjustment for BMI the association no longer reached significance (partial $\rho=0.30$; $p=0.053$).

Table 4. Oncological characteristics of the malignant subgroup (n=21)

Histological type (n=21)		
Histological type	n	%
Invasive carcinoma	19	90.5
Ductal carcinoma in situ (DCIS)	1	4.8
Malignant phyllodes tumor	1	4.8
Stage distribution (n=21)		
Stage	n	%
Stage 0 (in situ)	1	4.8
Stage I	4	19.0
Stage IIA	8	38.1
Stage IIB	2	9.5
No residual invasive tumor in the breast after neoadjuvant therapy (ypT0/is)	4	19.0
Unknown	1	4.8
Phyllodes (not staged)	1	4.8
Molecular subtype – invasive carcinomas only (n=19)		
Molecular subtype	n	%
Luminal A	6	31.6
Luminal B	5	26.3
HER2-positive	7	36.8
Triple-negative (TNBC)	1	5.3
Timing of surgery (n=21)		
Timing	n	%
Upfront surgery	13	61.9
After neoadjuvant therapy	8	38.1

ypT0/is indicates no residual invasive tumor in the breast after neoadjuvant therapy. Residual ductal carcinoma in situ could not be distinguished from complete absence of tumor in the records, and nodal status was not systematically available; these cases were therefore not classified as pathological complete response, which requires ypT0/is ypN0. Ductal carcinoma in situ (DCIS) was classified as stage 0. Because malignant phyllodes tumor is not subject to TNM staging for breast carcinoma, it is shown separately in the stage distribution and was excluded from the molecular subtype analysis. Molecular subtype percentages were calculated over the number of invasive carcinomas (n=19). HER2: Human epidermal growth factor receptor 2.

Discussion

This single-center series compared bilateral reduction mammoplasty performed for benign symptomatic macromastia with the same operation performed in the setting of breast malignancy. The two groups proved remarkably similar: age, body mass index, body weight, smoking and diabetes did not differ, nor did resection weights, operative time or complication rates. The one parameter that separated them was the choice of pedicle: an inferior pedicle

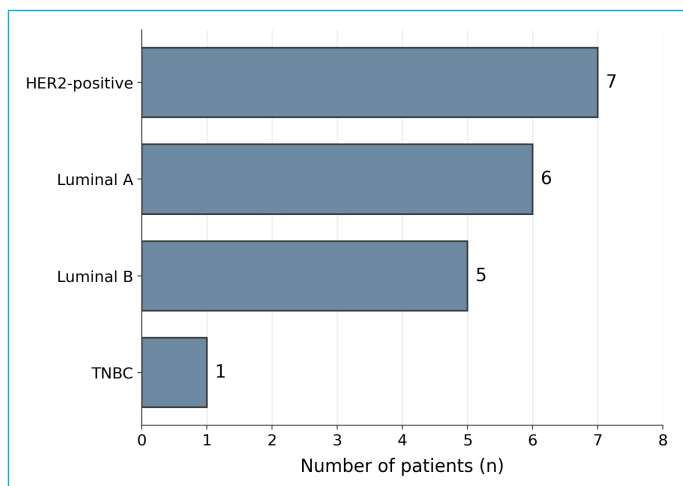


Figure 1. Distribution of surrogate molecular subtypes in invasive carcinomas (n=19). DCIS and the malignant phyllodes tumor were not included.

was used in three-quarters of malignant cases but in fewer than a third of benign ones. This does not represent an incidental imbalance between the groups but a deliberate oncological strategy. In benign macromastia the pedicle is selected on morphological grounds, whereas in the malignant setting it is dictated by the location of the tumor, since the pedicle must be sited away from the lesion so that the tumor-bearing parenchyma can be resected en bloc with adequate margins; an inferior pedicle is therefore favoured for upper-quadrant lesions and a superior pedicle for lower-quadrant ones.^[9] The predominance of the inferior pedicle in the malignant group is thus a direct consequence of tumor distribution rather than of any difference in breast anatomy, and it did not translate into a difference in resected volume between the two techniques. Alongside this comparison, two relationships emerged that apply to the cohort as a whole: resection weight rose in parallel with body mass index and with operative time, and, most strikingly, it increased stepwise across the four grades of preoperative activity restriction. Taken together, these findings suggest that the technical and perioperative profile of reduction mammoplasty is largely independent of the indication for which it is performed, while the volume of tissue

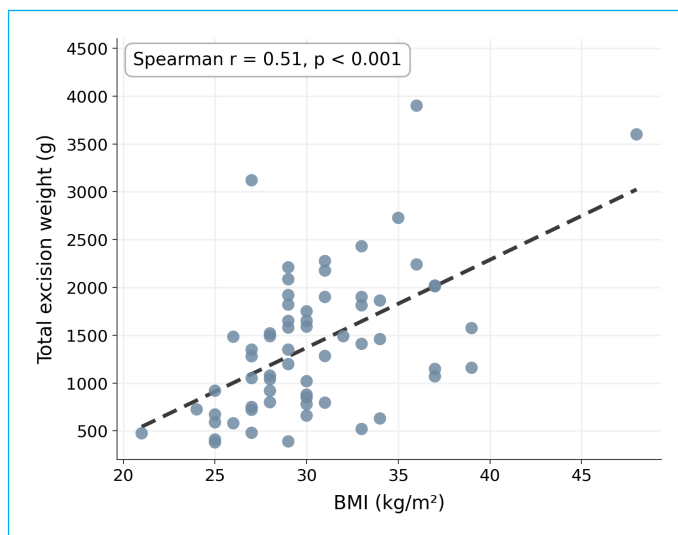


Figure 2. Association between BMI and total excision weight (Spearman $\rho=0.51$; $p<0.001$). The dashed line represents an unadjusted linear fit shown for visualisation only.

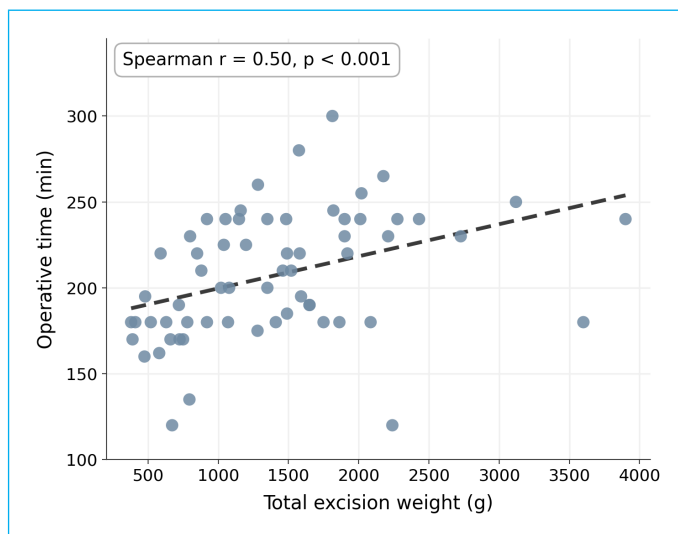


Figure 3. Association between total excision weight and operative time (Spearman $\rho=0.50$; $p<0.001$). The dashed line represents an unadjusted linear fit shown for visualisation only.

Table 5. Spearman correlation analyses

Association	ρ	p
BMI – Total excision	0.51	<0.001
Total excision – Operative time	0.50	<0.001
BMI – Operative time	0.27	0.036
Age – Total excision	0.05	0.722

BMI: Body mass index.

removed was associated with the functional burden the patient reported before surgery.

The most notable finding of this series was the stepwise relationship between the severity of preoperative activity restriction and the volume of tissue resected, the median resection in patients with severe restriction being more than four times that in patients without restriction. This gradient is compatible with the view that the functional burden of macromastia relates to the volume of breast tissue rather than being a nonspecific complaint, although resection weight is not a direct measure of preoperative breast volume and is influenced by operative planning,

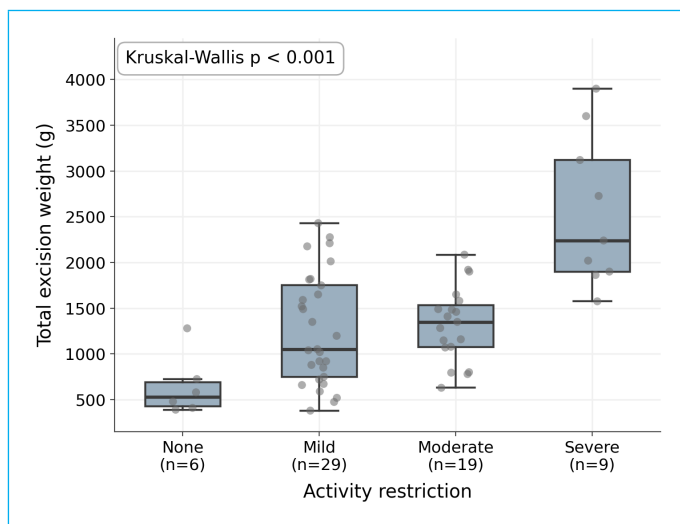


Figure 4. Total excision weight according to the degree of preoperative activity restriction. Resection weight increased progressively across increasing grades of activity restriction (Kruskal–Wallis $p < 0.001$).

so the association should not be read as a causal or linear one. It is consistent with radiological evidence that women with larger breasts have greater thoracic kyphosis and lumbar lordosis angles, differences that were attributable to breast size rather than to body mass index, since grouping the same cohort by body mass index produced no difference in vertebral angles.^[11] It is also consistent with the observation that these angles decrease significantly after reduction, with the magnitude of postural correction correlating with the weight of tissue excised.^[12] In the present series the gradient was independent of age, which argues against age-related degenerative spinal disease as its principal driver; the same independence from age has been reported for both preoperative vertebral angles and their postoperative correction.^[11,12] Body mass index, however, is a substantial confounder here: it followed the same step-wise gradient across activity categories and correlated with both activity restriction and resected volume. After adjustment for BMI the association between activity restriction and resection weight was attenuated but remained signifi-

cant in the whole cohort, whereas in the benign subgroup alone it fell just short of significance. The functional burden reported before surgery therefore appears to be related to resected volume partly, but not wholly, through generalized obesity, and this relationship requires confirmation in a larger cohort using a validated instrument.

The overall complication rate of 7.9% in this series, with wound dehiscence the most frequent event and no nipple–areola complex necrosis or reoperation, is consistent with contemporary benchmarks. A meta-analysis of 61 studies comprising more than 71 000 patients reported a mean complication incidence of 12.3% with a range extending from 3.8% to 57.9%^[13], and a registry analysis using a 30-day observation window comparable to the present one reported an overall rate of 9.2%.^[14] The wide variation among published series probably reflects, at least in part, differences in complication definitions, patient characteristics, duration of follow-up and methods of outcome ascertainment. A cohort scored with the Clavien–Dindo classification, in which any deviation from the normal postoperative course counts as an event, reported an overall rate of 38% while noting that database studies fail to capture conservatively managed wound problems and therefore underestimate them.^[15] Complications were numerically more frequent in the malignant group, but the difference was not significant, in keeping with two previous comparative series that likewise found no excess risk when reduction was performed for malignancy.^[9,10]

Although the small number of events precluded formal risk-factor analysis, the direction of the observed associations mirrors the published evidence. Patients who developed a complication had a higher body mass index than those who did not, a difference that approached but did not reach significance, and four of the five affected patients were obese; obesity is the most consistently reported risk factor after reduction mammoplasty^[13,14,16] and has been linked in pooled analyses to wound dehiscence in particular.^[13] Neither smoking nor diabetes was associated with complications here, which is unsurprising given that a single-center series of more than 1400 patients also failed to demonstrate either association.^[17] Resected volume was likewise unrelated to complications, an area in which the pooled evidence is itself inconsistent: one meta-analysis found that a unilateral resection above 1000 g increased risk while a total resection above the same threshold did not^[15], whereas another found no significant association for resection weight at all^[13], and one large single-center series identified it as the principal independent risk factor.^[16] The median unilateral resection here remained below 1000 g, which may partly explain the low event rate. Age was similarly unrelated to complications, consistent with

Table 6. Total excision weight according to activity restriction

Activity restriction	n	Median excision (g)
None	6	530
Mild	29	1052
Moderate	19	1350
Severe	9	2240

The difference between groups was significant by the Kruskal–Wallis test ($p < 0.001$).

pooled data showing no effect at either a 40- or a 50-year threshold^[15], despite individual series variously implicating older^[14] and younger^[17] patients. Finally, the predominance of the inferior pedicle in the malignant group might be expected to contribute to its numerically higher complication rate, since pooled data indicate a higher risk with the inferior pedicle than with a superomedial pedicle.^[13,17] That comparison, however, does not correspond to the one made here: pooled data found no significant difference between the inferior and the superior pedicle^[13], the two techniques used in this cohort, although a 760-patient series reported fewer complications with the superior pedicle.^[17] In the present series complication rates did not differ between the two techniques.

Several differences that have reached significance in larger series were only numerical here. Resection weight was lower in the malignant group, as reported both in a series of more than 1300 breasts and in a comparison of oncoplastic with benign reductions^[5,10]; with 21 malignant patients, the present study was underpowered to confirm this. Age likewise did not differ significantly, although malignant patients were on average older. This may reflect the composition of the cohort as much as sample size: the benign patients here were older than those in comparable Western series, in which reduction for benign macromastia is typically performed in the late thirties or early forties^[5,10], suggesting that symptomatic macromastia is referred for surgery later in this population.

The oncological profile of the malignant subgroup, with predominantly early-stage disease and more than a third of patients operated after neoadjuvant therapy, is comparable to that of recent bilateral reduction series in breast cancer.^[18] Reported complication rates in that setting range from 18% to 40%^[18], and a systematic review of 1715 oncoplastic breast reductions found mean rates of 3% for hematoma, 4% for dehiscence, 3% for infection, 2% for nipple necrosis and 2% for seroma^[19] — figures closely matching the present series despite its smaller size. Two observations from that literature are relevant to the interpretation of the higher, though non-significant, complication rate in the malignant group here: major complications in bilateral reduction for cancer occur almost exclusively on the tumor-bearing side, and contralateral symmetrization adds no measurable surgical burden.^[18] The distribution of pedicles in the present series is also consistent with the reported predominance of upper-quadrant lesions in such cohorts, for which an inferior pedicle is the technique of choice.^[18] Because margin status, re-excision and the timing of adjuvant therapy were not among the endpoints of this study, its findings speak to the perioperative rather than the oncological equivalence of the two indications.

This study has several limitations. Its retrospective, single-center design and the modest sample size, particularly of the 21-patient malignant subgroup, limit statistical power; several differences that reached significance in larger series were only numerical here, and the five recorded complications were too few for any formal risk-factor analysis. The significant difference in height may represent a chance finding among multiple comparisons. Being confined to routinely collected records, the dataset lacked several relevant variables: degenerative spinal disease, tumor quadrant, nodal status after neoadjuvant therapy, the distinction between ypT0 and ypTis, the immunohistochemical thresholds used for subtype assignment, and whether every malignant patient had macromastia sufficient in itself to warrant reduction. High-risk proliferative lesions were not recorded separately and the pathological sampling protocol was not standardized, so their absence cannot be taken as evidence that none were present.^[7] Activity restriction was graded on an ordinal scale that has not been formally validated, and no patient-reported outcome instrument was administered. Follow-up was limited to the early post-operative period, leaving late complications, aesthetic outcomes and long-term oncological endpoints unaddressed.

Conclusion

Bilateral reduction mammoplasty performed for a malignant indication and for benign symptomatic macromastia yielded comparable demographic, surgical and complication profiles, the principal difference being the selection of an inferior pedicle in most malignant cases as a deliberate consequence of tumor location. The overall complication rate was low, with no nipple–areola complex necrosis and no reoperation, supporting the safety of the technique in both settings. Across the cohort, the volume of tissue resected increased in parallel with the severity of preoperative activity restriction, an association that was attenuated but not abolished by adjustment for body mass index. Preoperative functional limitation was therefore associated with a larger resection in this cohort, a finding that should be confirmed prospectively with validated patient-reported measures before any inference is drawn about the volume of tissue required for symptom relief.

Disclosures

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