The Breast 71 (2023) 47–53

Contents lists available at ScienceDirect

The Breast

journal homepage: www.journals.elsevier.com/the-breast

Aesthetic results were more satisfactory after oncoplastic surgery than after total breast reconstruction according to patients and surgeons

Fabiana Christina Araújo Pereira Lisboa [a,*], Régis Resende Paulinelli [b,c], Lucimara Priscila Campos Veras [d], Luiz Fernando Jubé Ribeiro [c], Luis Fernando Pádua Oliveira [b], Rosemar Macedo Sousa Rahal [b], Aloisio Garcia Sousa [e], Ruffo Freitas-Júnior [b,c], João Batista de Sousa [a]

[a] Faculty of Medicine, University of Brasília - UnB, Distrito Federal, Brasília, Brazil
[b] Mastology Program, Department of Gynecology and Obstetrics, Federal University of Goiás, Goiânia, Goiás, Brazil
[c] Breast and Gynecology Unit, Araújo Jorge Cancer Hospital, Goiás Cancer Combat Association, Brazil
[d] Foundation for Teaching and Research in Health Sciences - FEPECS, Distrito Federal, Brasília, Brazil
[e] Plastic Surgery Department, Federal University of Goiás, Brazil

ARTICLE INFO

Keywords:
Breast cancer
Conservative surgery
Mammaplasty
Mastectomy
Breast reconstruction
Patient satisfaction
Oncoplastic surgery

ABSTRACT

Introduction: Patient satisfaction after breast cancer surgery has an impact on body image, sexual function, self-esteem, and quality of life and may differ from the perception of the attending physician. This study aimed to compare the aesthetic outcomes and satisfaction with conservative oncoplastic surgeries, mastectomies, and total breast reconstruction.

Methods: We included 760 women diagnosed with invasive breast carcinoma or phyllodes tumors who returned at least 6 months after surgery or radiotherapy at two public hospitals and a private clinic between 2014 and 2022. Data was collected prospectively from patients and retrospectively from their medical records using a specific form after obtaining their informed consent. Aesthetic outcomes and quality of life were assessed using the BREAST-Q©, Harris Scale, and BCCT.core software. Data were evaluated using the SPSS statistical software. Statistical significance was set at $p < 0.05$. This study was approved by the hospital ethics committees.

Results: A total of 405 (53.29%) partial and 355 (46.71%) total reconstructions were included. Patients who underwent partial reconstruction were older and had higher body mass index. Patients who underwent total reconstruction had larger tumors with advanced clinical and pathological stages. Clinical and surgical complications occurred more frequently in the total reconstruction group. A greater number of reparative surgeries and lipofilling procedures were required for total reconstruction. According to the BREAST-Q, the partial reconstruction group showed significantly higher levels of women's satisfaction with their breasts, the surgical outcomes, psychosocial and sexual well-being, provision of information, and the reconstructive surgeon. Only physical well-being was slightly higher in the total reconstruction group. In most cases, the results were rated good or excellent. Physicians considered partial reconstructions to have better results than total reconstructions, although this difference was not perceived by the BCCT.core software.

Conclusion: Women who underwent partial breast reconstruction had higher levels of satisfaction in several domains, lower frequency of complications, and required fewer surgeries to complete their reconstruction than women who underwent total reconstruction. Physicians were also more satisfied with the results of partial reconstructions.

1. Introduction

Breast cancer is the most common type of cancer affecting women worldwide. Surgical treatment for breast cancer has always carried the stigma of mutilation and loss of quality of life but has been improving over the years with the development of many reconstructive options

* Corresponding author. Faculty of Medicine, University of Brasilia, Asa Norte, Distrito Federal, Brasilia, 70910-900, Brazil.
E-mail address: fabianachristinalisboa@gmail.com (F.C. Araújo Pereira Lisboa).

https://doi.org/10.1016/j.breast.2023.07.006
Received 11 April 2023; Received in revised form 9 July 2023; Accepted 11 July 2023
Available online 15 July 2023

after oncological resection [1]. High-level evidence from various prospective randomized studies confirms that breast-conserving surgery, followed by radiation therapy, is equally safe as mastectomy. This realization establishes breast-conserving surgery as a safe alternative to mastectomy [2–4]. Considering the comparable prognoses of early stage breast cancer after breast-conserving therapy and mastectomy, quality of life should be the main priority in treatment selection [5].

Impaired cosmetic results after breast cancer surgery affect women's body image, sexual function, and self-esteem and therefore have a negative effect on their quality of life after breast-conserving therapy and mastectomy [6,7]. The female breast plays an important role in society and every woman's life. In addition to its physiological role in breastfeeding, it is culturally associated with femininity and fertility and is a prominent secondary sexual characteristic [8]. Patient satisfaction with surgical results may be influenced not only by socioeconomic factors, ethnicity, and medical knowledge but also by the surgical technique used, side effects of radiation therapy, and asymmetry associated with size or shape. All appropriate options for breast reconstruction should be discussed with patients, regardless of whether they are locally available in the service [9]. Interestingly, patient satisfaction with surgical results may differ from the perception of attending physicians, with patients reporting higher levels of satisfaction compared to physicians [10].

Breast oncoplastic surgery combines the oncological principles of breast-conserving surgery with plastic surgery techniques to improve cosmetic results by immediately reshaping the breast at the time of the intervention to achieve better shape and symmetry [11]. Oncoplastic surgery has generally been compared with classic breast-conserving surgery; however, small tumors that are removed without major defects are not typically treated with oncoplastic surgery techniques [12–14]. Oncoplastic surgery may allow conservative treatment of larger tumors with better aesthetic results and a lower incidence of compromised margins and is used to avoid mastectomy [15–17]. Therefore, we believe that the most appropriate comparison for oncoplastic surgery should be made against mastectomy with total breast reconstruction, which are the two options usually used in tumors with unfavorable tumor/breast ratios [18,19].

The objective of our study was to compare the satisfaction levels of surgeons and women with breast tumors regarding conservative oncoplastic surgery and total breast reconstruction mastectomy.

2. Methods

This study included 760 women diagnosed with invasive breast carcinoma or phyllodes tumors, operated on by breast surgeons and plastic surgeons at the Clinics Hospital and Araujo Jorge Cancer Hospital in Goiania, who considered the reconstructive process to be completed and returned for surgical review after at least 6 months of reconstructive surgery and radiation therapy between June 2014 and May 2022. At the time of the return consultation, information was collected from medical records and patients using a specific form and typed into an Excel database (Microsoft Office 2007) after obtaining their informed consent. Frontal photographs of the surgical results were taken with a 50 mm lens, including the shoulders and elbows. Information on socioeconomic and cultural factors, tumor characteristics, and the type of surgery performed was collected. The results obtained from the questionnaires of the conservative surgery group were compared with those of the mastectomy group regarding the degree of satisfaction with the aesthetic result concerning the type of surgical technique used. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist was applied, which is a checklist containing 22 items used to provide essential information related to the study design to aid in manuscript writing [20].

2.1. Risks and benefits

By contributing to this research, the participants have made a valuable contribution towards advancing breast reconstruction of future patients. The participant's exposure occurred as part of routine physical examination procedures for data collection and photographic records in the research. No additional risks were involved in handling their medical records. This study was approved by the research ethics committees of both public hospitals.

2.2. Methods for evaluating aesthetic results

The degrees of patient satisfaction and quality of life were evaluated using the postoperative module of the Breast-Q©breast reconstruction questionnaire and the Harvard-Harris scale [21–23].

The Breast-Q is a validated questionnaire used to evaluate patient perceptions of results after breast surgery, consisting of multiple health-related quality of life domains. Higher scores are associated with increased satisfaction and quality of life. Domains with multiple items are also available to evaluate psychosocial, physical, and sexual well-being; satisfaction with breasts; and experience of care [21,22].

Physicians' opinions on symmetry and aesthetic outcomes were measured using the Harris scale, which evaluates aesthetic outcomes as poor (seriously distorted breast), fair (clearly different breast but not seriously distorted), good (breast with slight difference), and excellent (almost identical to the other breast) [23].

The photographs were analyzed using BCCT.core software, which objectively evaluates the symmetry between breasts through measurements and differences in coloration [24].

2.3. Statistical analysis

Data were analyzed using SPSS statistical software. Normally distributed numeric variables were compared using means, standard deviations, and Student's t-tests. Numeric variables without a normal distribution were compared using the median, interquartile range, and Mann–Whitney *U* test. Ordinal variables were compared using frequencies, percentages, and chi-square tests. Categorical variables were compared using frequencies, percentages, and chi-square or Fisher's exact tests, as required. Statistical significance was set at $p < 0.05$.

3. Results

Of the 760 women with breast cancer or phyllodes tumors included in the study, 360 (44.74%) were sourced from one of the surgeons' private offices, 304 (40.00%) from the Clinics Hospital of the Federal University of Goias, and 116 (15.26%) from the Araujo Jorge Cancer Hospital. The median follow-up time after breast cancer treatment was 57 (27.25–105.00) months. The median time since the last reconstructive surgery was 37 (15.75–76.00) months. A total of 405 (53.29%) partial reconstructions (oncoplastic surgery) and 355 (46.71%) total reconstructions were performed. Table 1 shows the characteristics of patients, tumors, clinical treatments, and physicians according to the type of reconstruction performed (partial or total). Patients who underwent partial reconstruction were older and had higher body mass index.

Patients who underwent total reconstruction had larger tumors with advanced clinical and pathological stages (Table 1). These patients also had a higher frequency of previous breast surgery. Neoadjuvant chemotherapy was more frequently administered in partial reconstructions, whereas adjuvant chemotherapy was more frequently administered in total reconstructions. Hormone and radiotherapy were administered more frequently after partial reconstruction (Table 1).

Breast surgeons (mastologists) performed a proportionally greater number of partial reconstructions than plastic surgeons. Clinical and surgical complications occurred more frequently in the total

Table 1
Characteristics of patients, tumors, clinical treatment performed, hospitals, and surgeons.

	Partial Reconstruction		Total Reconstruction		Partial Reconstruction	Total Reconstruction	
	Mean (+SD)	Median (IQR)	Mean (+SD)	Median (IQR)	N(%)	N(%)	p
Age	**56.93** (±11.59)		53.46 (±10.54)				**<0.001**
BMI	–	**26.67** (24.34–29.34)		25.30 (23.02–28.00)			**<0.001**
Alcoholic		–			47 (11.69)	Sim 19 (5.41)	**0.02**
Diabetes					**84 (22.46)**	**93 (30.49)**	**0.018**
Hypertension		30.00 (16.00–45.00)		**40.00** (25.00–55.50)			**<0.001**
Clinical Staging							
0					8 (2.07)	**12 (3.80)**	**<0.001**
I					130 (33.59)	**52 (16.46)**	
II					177 (45.74)	**159 (50.32)**	
III					69 (17.83)	**92 (29.43)**	
IV					3 (0.78)	**0 (0.00)**	
Pathological Staging							
0					75 (18.94)	**63 (19.21)**	**0.037**
I					139 (35.10)	**85 (25.91)**	
II					139 (35.10)	**126 (38.41)**	
III					41 (10.35)	**54 (16.46)**	
IV					2 (0.51)	**0 (0.00)**	
Chemotherapy							
Neoadjuvant					131 (32.67)	**102 (29.23)**	**0.021**
Adjuvant					132 (32.92)	**150 (42.98)**	
Palliative					2 (0.50)	**0 (0.00)**	
Hormone therapy							
Neoadjuvant					**3 (0.75)**	3 (0.87)	**0.033**
Adjuvant					**293 (72.89)**	221 (64.43)	
Palliative					**7 (1.74)**	6 (1.75)	
Prophylactic					**28 (6.97)**	19 (5.54)	
Radiotherapy							
Neoadjuvant					**2 (0.50)**	2 (0.58)	**<0.001**
Adjuvant					**381 (94.54)**	161 (46.53)	
Palliative					**1 (0.25)**	0 (0.00)	
Surgeon							
Mastologist					**388 (95.80)**	229 (64.51)	
Plastic surgeon					17 (4.20)	**126 (35.49)**	**<0.001**
Clinical or surgical complications					141 (34.81)	**207 (58.31)**	**<0.001**

Legend.
SD - standard deviation.
IQR - interquartile range.
BMI - Body mass index.

reconstructions. There were no statistically significant differences between the groups in terms of education, family income, menopausal status, lifestyle habits (smoking and alcohol consumption), comorbidities (diabetes and hypertension), post-neoadjuvant chemotherapy tumor size, histological type and grade, St. Gallen subtype, clinical and pathological responses to neoadjuvant chemotherapy, use of trastuzumab, and location of surgery (private office vs. public hospital) (Table 1).

Surgical characteristics are listed in Table 2. Among partial reconstructions, mammoplasty was the most frequently performed. The TRAM pedicle flap was the most commonly used technique for total reconstruction. As shown in Table 3, there was a higher proportion of immediate reconstructions combined with oncoplastic surgeries than with total reconstructions. Immediate contralateral symmetry was also more common in partial reconstructions.

There was a need for more corrective and lipofilling procedures after total reconstruction. The frequency of narrow or involved margins was low at 8.5% in partial reconstructions and 5.82% in total reconstructions, with no statistical difference. Immediate reconstruction of the areola and nipples was often possible in cases of partial reconstructions. The most frequent type of incision in partial and total reconstructions was the Wise pattern (inverted T) and the transverse or oblique Stewart incision, respectively.

According to the BREAST-Q, women's satisfaction with their breasts, surgical outcomes, psychosocial and sexual well-being, provision of information, and the reconstructive surgeon were significantly better in the partial reconstruction group than in the total reconstruction group (Table 4). Only physical well-being was slightly higher after total reconstructions.

The opinions of doctors on the Harris scale and the results of the BCCT.core program are presented in Table 5. In most cases, the results were rated as good or excellent. Doctors considered partial reconstructions to have better results than total reconstructions, although this difference was not detected by the BCCT.core software (Fig. 1).

4. Discussion

Recent advancements in skin- and nipple-sparing mastectomies, along with enhanced techniques and implants for breast reconstruction, have expanded the indications for mastectomies, especially bilateral mastectomies, in recent decades. Many women and surgeons have the mistaken perception that breast removal can improve oncological safety. However, large randomized studies have shown that conservative treatment is as safe as mastectomy. Recently, large cohort studies have shown better oncological results with conservative treatment [25]. This benefit has been shown to be present even after controlling for

Table 2
Surgical techniques performed.

Cancer surgery	N (%)
Quadrantectomy	385 (50.66)
Partial mastectomy	49 (6.45)
Nipple sparing mastectomy	94 (12.37)
Mastectomy skin sparing	82 (10.79)
Classic mastectomy 125	(16.45)
Mastectomy and flap for closure	25 (3.29)
Partial reconstruction	
Mammoplasty	216 (53.33)
Glandular rotation	88 (21.73)
Thoracolateral flap	17 (4.20)
Bilobed flap	16 (3.95)
Thoracoepigastric flap	13 (3.21)
Burrow's Triangles	9 (2.22)
Radiated incision and repositioning of CAP	8 (1.98)
Autologous latissimus dorsi	6 (1.48)
Dermoglandular rotation	5 (1.23)
Shutter	5 (1.23)
Implant	5 (1.23)
Grisotti	3 (0.74)
Another technique	7 (2.47)
Multiple combined techniques	8 (1.98)
Total reconstruction	
Monopedicled TRAM	130 (36.62)
Direct implant	102 (28.73)
2 stroke (expander and implant)	59 (16.62)
Definitive expander (Becker)	17 (4.79)
Bipedicled TRAM	17 (4.79)
Latissimus dorsi and implant	17 (4.79)
Autologous latissimus dorsi	8 (2.25)
Multiple Combined Techniques	4 (1.13)

Legend.
TRAM – Transverse rectus abdominais muscle.

Table 3
Characteristics of reconstructive surgeries performed.

	Parcial reconstruction N (%)	Total reconstruction N (%)	p
Reconstruction time			
Immediate	**381 (94.07)**	277 (78.03)	**<0.01**
Late	24 (5.93)	**78** (21.97)	
Contralateral symmetrization			
Immediate	**218 (53.82)**	93 (26.20)	**<0.01**
Late	26 (6.42)	**142 (40.00)**	
Number of surgeries			
1	345 (85.19)	**125 (35.21)**	**<0.01**
2	43 (10.62)	**116 (32.68)**	
3 or more	17 (4.19)	**114 (32.11)**	
Associated fat grafting	25 (6.19)	**54 (15.25)**	**<0.01**
Reconstruction of the CAC			
Immediate	**14 (38.89)**	2 (1.48)	**<0.01**
Late	22 (61.11)	**133 (98.52)**	
Type of skin incision			
Wise pattern (inverted T)	**128 (31.60)**	16 (4.51)	**<0.01**
Radiated	59 (14.57)	56 (15.77)	
Para-areolar	46 (11.36)	3 (0.85)	
Round block	34 (8.40)	3 (0.85)	
Upright, J or L	29 (7.16)	12 (3.38)	
Geometric compensation (Z or S)	27 (6.67)	0 (0.00)	
Periareolar (up to 180°)	20 (4.94)	1 (0.28)	
Inframammary fold	7 (1.73)	34 (9.58)	
Periareolar and radiate	5 (1.23)	9 (2.54)	
Transverse or oblique	2 (0.49)	**205 (57.75)**	
Other	42 (10.37)	15 (4.23)	

Legend.
CAC - Capillary Areola Complex.

confounding factors such as tumor size, staging, and association with radiotherapy [26]. Even in locally advanced and multicentric tumors, conservative treatment seems to be equivalent to mastectomy if the lesion can be adequately excided with clear margins and combine it with radiotherapy [15,27].

Table 4
Degree of satisfaction with the BREAST-Q in partial and total breast reconstructions.

	Parcial reconstruction	Total reconstruction	p
	Median (IQR)	Median (IQR)	
Satisfaction with the breasts	**75.00** (62.00–91.00)	69.00 (58.00–81.00)	**<0.001**
Satisfaction with the results	**100.00** (86.00–100.00)	100.00 (75.00–100.00)	**<0.001**
Psychosocial well-being	**86.00** (67.00–100.00)	82.00 (65.00–100.00)	**0.049**
Sexual well-being	**72.00** (54.00–100.00)	63.00 (49.00–83.00)	**0.002**
Physical well-being	66.00 (57.00–74.00)	**68.00** (58.50–77.00)	**0.009**
Physical well-being with the abdomen after TRAM	99.00 (73.00–99.50)	79.00 (59.00–89.00)	0.110
Satisfaction with the nipple	85.00 (61.00–100.00)	74.00 (55.00–100.00)	0.388
Satisfaction with the information	**81.50** (69.00–100.00)	77.00 (65.00–91.00)	**0.001**
Satisfaction with the reconstructive surgeon	**100.00** (100.00–100.00)	100.00 (91.00–100.00)	**0.004**
Satisfaction with the medical team (besides the reconstructor)	100.00 (100.00–100.00)	100.00 (100.00–100.00)	0.460
Satisfaction with office professionals	100.00 (100.00–100.00)	100.00 (100.00–100.00)	0.106

Legend.
TRAM – Transverse rectus abdominais muscle.
IQR - Interquartile Range.

This was one of the largest cohorts to compare oncoplastic surgery with mastectomy and reconstruction [13]. All the patients responded to the questionnaires and were carefully evaluated and photographed. However, only patients who underwent surgery and returned for evaluation with the researching physician after at least 6 months of radiotherapy were included in the study, excluding those who did not meet these criteria. This corresponds to approximately 80% of the private clinic patients and 20% of the public service patients. In public services, accessing a reconstructive surgeon for follow-up or subsequent appointments poses greater challenges, and patients are usually visited by different doctors. Some selection bias is expected, as highly satisfied women may no longer find it necessary to return for further evaluation, while highly dissatisfied women may have sought other doctors for additional surgical procedures. In addition, the compared cohorts of partial and total reconstructions were not entirely homogeneous and differed in some characteristics, such as age, frequency of obesity, tumor size, staging, and treatment of lesions, which may interfere with satisfaction levels.

However, we observed several advantages to oncoplastic surgery over total breast reconstruction. Women undergoing partial reconstruction were more satisfied with almost all parameters analyzed using BREAST Q, as also observed in other studies [14,17,18].

Data from a prospective study showed that patients who may benefit from breast-conserving surgery include women with comorbidities and a high BMI, elderly women, and those who require axillary lymph node dissection [11]. The literature shows that age is strongly associated with the desire for improvement in cosmetic results and that women who desired plastic surgery were probably younger. Women who were surveyed more than 5 years after their diagnosis were substantially less likely to desire additional procedures to improve cosmetic appearance compared to women who were surveyed within the first year after diagnosis. A cross-sectional study showed that after breast-conserving surgery, 21.6% of patients stated that they desired surgical improvement compared to 29.8% of mastectomized patients, in whom the desire

Table 5
Subjective aesthetic result attributed by the surgeon using the Harvard scale and objective measurement using the BBCT.core program in partial and total breast reconstructions.

	Harvard Scale			BBCT.core		
	Parcial reconstruction N (%)	Total reconstruction N (%)	p	Parcial reconstruction N (%)	Total reconstruction N (%)	p
Poor	5 (1.23)	22 (6.20)	**<0.001**	14 (1.84)	18 (2.37)	0.276
Regular	71 (17.53)	97 (27.32)		97 (23.95)	67 (18.87)	
Good	174 (42.96)	175 (49.30)		239 (50.01)	214 (60.28)	
Great	155 (38.27)	61 (17.18)		55 (13.58)	56 (15.77)	

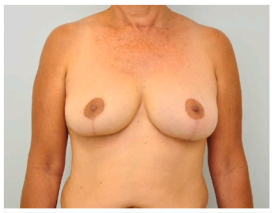

Photo A

Photo B

Photo	BREAST-Q breast satisfaction	BREAST-Q satisfaction with results	BREAST-Q social well-being	REAST-Q sexual well-being	BREAST-Q physical well-being	Harvard Scale	BCCT.core Program	Surgery type
A	73	75	73	100	63	4	4	Oncoplastic mammaplasty
B	55	100	58	36	68	2	2	Implant / expander

Legend (Harvard Scale and BCCT.core Program): 1 poor; 2 fair ;3 good; 4 excellent

Fig. 1. Examples of cosmetic outcome scores for partial and total breast reconstructions according to the Breast-Q, Harvard Scale, and BCCT.core computer program.

for improvement remained constant up to 5 years after the initial operation, whereas it decreased in the group of patients after breast-conserving surgery [7].

Breast reconstruction with expanders and silicone implants is the most commonly used technique in most countries [28]. In Brazil, there is still a high incidence of locally advanced tumors compared to developed countries, which can directly influence the complexity of procedures, choice of surgical technique, expected outcomes, complications, and satisfaction rates [29,30]. Almost half of the mastectomized patients in this cohort required radiotherapy, which may partially explain the widespread use of myocutaneous flaps, particularly TRAM flaps. Difficulties in accessing implants in the public healthcare system have also contributed to the increased use of flaps. The abdominal aesthetic benefit that TRAM flaps typically bring to patients may also explain why women reported slightly higher physical well-being despite being less satisfied with the reconstruction and results [31]. Autologous reconstructions tend to have higher satisfaction rates than implant-based reconstructions, especially in the long term [32]. Therefore, we believe that the expected difference in favor of partial reconstruction would likely be even greater if silicone implants were used more frequently.

Mastectomy with simultaneous reconstruction reduces the risk of psychological distress and should be recommended to all women after breast amputation who do not have contraindications for this type of surgical treatment [16]. Regarding psychological correlates, higher levels of depression measured using the Hospital Anxiety and Depression Scale were associated with a higher rate of reconstruction. In patients undergoing breast-conserving surgery, a retrospective analysis showed that better cosmetic outcomes were associated with less depression and anxiety, better body image, satisfaction with sexual life, and better self-esteem. Compared to mastectomy and reconstruction, breast-conserving therapy was associated with lower psychosocial morbidity. Early intervention is necessary, particularly for women who associate cosmetic appearance with sexuality [5]. In the literature, oncoplastic breast surgery is preferred over mastectomy regardless of the reconstruction type [18,19]. Nipple preservation was preferred over skin-sparing mastectomy; autologous reconstruction was preferred over implant-based reconstruction, and prepectoral implant placement was preferred over subpectoral implant placement [1].

Although the re-excision rate for breast-conserving surgery can exceed 25% in some series, oncoplastic surgery can greatly reduce the possibility of compromised margins [18,19]. In our cohort, the rate of compromised or minimal margins was less than 10% for both the total and partial reconstructions, with no significant differences. Mastectomy with reconstruction is associated with a greater number of surgical procedures and complications, requires a trained surgeon in the field who may not always be available, and consumes more resources than conservative treatment [2]. A prospective study showed that surgery-related complications occurred in 2.6% and 17.4% of patients who underwent breast-conserving surgery and mastectomy, respectively [10]. Radiation therapy appears to be an important independent factor for breast satisfaction beyond the type of surgery performed [5,33].

The BCCT.core software is an objective method for evaluating symmetry based on photographs that considers measures for symmetry evaluation. Initially, a reduction in subjectivity was welcomed in scientific research; however, the method was originally developed only for breast-conserving surgery; this depends on the quality of the photograph and differences in lighting between one breast and the other [24]. This may explain why the physicians' opinions coincided with the patients' opinions regarding the best aesthetic results of partial reconstruction; nonetheless, similar improvement in the results was not perceived by the BCCT.core.

Greater patient involvement in decision-making and higher stress associated with the disease diagnosis are associated with a higher frequency of mastectomy, justifying the systematic and worldwide increase in the number of mastectomies performed [34,35]. In addition, excessively high patient expectations regarding the effects of breast reconstruction procedures can affect their evaluation of satisfaction with the result [36]. The option for conservative treatment is preferred when the surgeon believes in its safety and conveys confidence in the patient [35].

A multidisciplinary approach and other reconstruction options, compared to mastectomy, in the treatment of early breast cancer may allow patients a greater degree of satisfaction and psychosocial well-being [34].

Oncoplastic surgery is expanding opportunities for breast conservation in patients who were traditionally treated with mastectomy [15–17, 37–39]. Patients reported lasting satisfaction after oncoplastic breast-conserving surgery, better quality of life, higher levels of satisfaction and well-being, better appearance and function of the donor site, less impact on daily activity, and more favorable surgical outcomes compared to those reported after mastectomy or immediate reconstruction. Oncoplastic surgery offers a valuable new alternative to mastectomy and reconstruction for patients facing a high risk of unacceptable cosmetic deformity after standard breast-conserving surgery, while achieving two increasingly important goals of modern breast cancer treatment: psychological well-being and good quality of life [40, 41].

5. Conclusion

Women who underwent partial breast reconstruction had higher levels of satisfaction in various domains, a lower frequency of complications, and required fewer procedures to complete the reconstruction than women who underwent total reconstruction. Physicians were also more satisfied with the results of partial reconstructions.

Disclosure

The authors declare no conflict of interest. There were no sources of support for the reported work, including grants, equipment, and medications, and no funding was received for this work from any organization.

Declaration of competing interest

The authors declare that they have no conflicts of interest. There are no sources of support for the reported work, including grants, equipment and drugs, and no funding was received for this work from any organization.

References

[1] Char S, Bloom JA, Erlichman Z, Jonczyk MM, Chatterjee A. A comprehensive literature review of patient-reported outcome measures (PROMs) among common breast reconstruction options: what types of breast reconstruction score well? Breast J 2021;27(4):322–9.

[2] Dolen U, Thornton M, Tenenbaum MM, Aripoli A, Patel A, Cyr AE, et al. A prospective cohort study to analyze the interaction of tumor-to-breast volume in breast conservation therapy versus mastectomy with reconstruction. Breast Cancer Res Treat 2020;181(3):611–21.

[3] Veronesi U, Cascinelli N, Mariani L, Greco M, Saccozzi R, Luini A, et al. Twenty-year follow-up of a randomized study comparing breast-conserving surgery with radical mastectomy for early breast cancer. N Engl J Med 2002;347(16):1227–32.

[4] Fisher B, Anderson S, Bryant J, Margolese RG, Deutsch M, Fisher ER, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. N Engl J Med 2002;347(16):1233–41.

[5] Lagendijk M, van Egdom LSE, van Veen FEE, Vos EL, Mureau MAM, van Leeuwen N, et al. Patient-reported outcome measures may add value in breast cancer surgery. Ann Surg Oncol 2018;25(12):3563–71.

[6] Bazzarelli A, Baker L, Petrcich W, Zhang J, Arnaout A. Patient satisfaction following level II oncoplastic breast surgery: a comparison with mastectomy utililizing the breast-Q questionnaire will be published in surgical oncology. Surg Oncol 2020;35:556–9.

[7] Bani MR, Beckmann K, Engel J, Lux MP, Rauh C, Eder I, et al. Correlates of the desire for improved cosmetic results after breast-conserving therapy and mastectomy in breast cancer patients. Breast 2008;17(6):640–5.

[8] Garcia ES, Veiga DF, Sabino-Neto M, Beraldo Cardoso FN, Batista IO, Leme RM, et al. Sensitivity of the nipple-areola Complex and sexual function following reduction mammaplasty. Aesthetic Surg J 2015;35(7):NP193–202.

[9] Jeevan R, Cromwell DA, Browne JP, Caddy CM, Pereira J, Sheppard C, et al. Findings of a national comparative audit of mastectomy and breast reconstruction surgery in England. J Plast Reconstr Aesthetic Surg 2014;67(10):1333–44.

[10] Leser C, Tan YY, Singer C, Zeillinger R, Fitzal F, Lehrner J, et al. Patient satisfaction after breast cancer surgery : a prospective clinical trial. Wien Klin Wochenschr 2021;133(1–2):6–13.

[11] Kelsall JE, McCulley SJ, Brock L, Akerlund MTE, Macmillan RD. Comparing oncoplastic breast conserving surgery with mastectomy and immediate breast reconstruction: case-matched patient reported outcomes. J Plast Reconstr Aesthetic Surg 2017;70(10):1377–85.

[12] Kuroda F, Urban C, Zucca-Matthes G, de Oliveira VM, Arana GH, Iera M, et al. Evaluation of aesthetic and quality-of-life results after immediate breast reconstruction with definitive form-stable anatomical implants. Plast Reconstr Surg 2016;137(2). 278e-86e.

[13] Santos G, Urban C, Edelweiss MI, Zucca-Matthes G, de Oliveira VM, Arana GH, et al. Long-term comparison of aesthetical outcomes after oncoplastic surgery and lumpectomy in breast cancer patients. Ann Surg Oncol 2015;22(8):2500–8.

[14] Bolliger M, Lanmüller P, Schuetz M, Heilig B, Windischbauer A, Jakesz R, et al. The iTOP trial: comparing immediate techniques of oncoplastic surgery with conventional breast surgery in women with breast cancer - a prospective, controlled, single-center study. Int J Surg 2022;104:106694.

[15] Silverstein MJ. Radical mastectomy to radical conservation (extreme oncoplasty): a revolutionary change. J Am Coll Surg 2016;222(1):1–9.

[16] Acea Nebril B, García Novoa A, Polidorio N, Cereijo Garea C, Bouzón Alejandro A, Mosquera Oses J. Extreme oncoplasty: the last opportunity for breast conservation-Analysis of its impact on survival and quality of life. Breast J 2019;25(3):535–6.

[17] Pearce BCS, Fiddes RN, Paramanathan N, Chand N, Laws SAM, Rainsbury RM. Extreme oncoplastic conservation is a safe new alternative to mastectomy. Eur J Surg Oncol 2020;46(1):71–6.

[18] Losken A, Chatterjee A. Improving results in oncoplastic surgery. Plast Reconstr Surg 2021;147(1). 123e-34e.

[19] Losken A, Dugal CS, Styblo TM, Carlson GW. A meta-analysis comparing breast conservation therapy alone to the oncoplastic technique. Ann Plast Surg 2014 Feb;72(2):145–9.

[20] von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Lancet 2007;370(9596):1453–7.

[21] Pusic AL, Klassen AF, Scott AM, Klok JA, Cordeiro PG, Cano SJ. Development of a new patient-reported outcome measure for breast surgery: the BREAST-Q. Plast Reconstr Surg 2009;124(2):345–53.

[22] Schunck TS, Veiga DF, Cavagna FA, LE Jr G, Neto MS, Ferreira LM. Brazilian version of the Breast-Q. Breast J 2021;27(1):72–4.

[23] Harris JR, Levene MB, Svensson G, Hellman S. Analysis of cosmetic results following primary radiation therapy for stages I and II carcinoma of the breast. Int J Radiat Oncol Biol Phys 1979;5(2):257–61.

[24] Cardoso MJ, Cardoso JS, Oliveira HP, Gouveia P. The breast cancer conservative treatment. Cosmetic results - BCCT.core - software for objective assessment of esthetic outcome in breast cancer conservative treatment: a narrative review. Comput Methods Progr Biomed 2016;126:154–9.

[25] Fancellu A, Porzani S, Prior M, Cottu P, Giuliani G, Sanna V, et al. Breast-conserving therapy leads to better survival outcomes compared to mastectomy in patients with early breast cancer: evidences from the recent literature. Minerva Surg 2023.

[26] de Boniface J, Szulkin R, Johansson ALV. Survival after breast conservation vs mastectomy adjusted for comorbidity and socioeconomic status: a Swedish national 6-year follow-up of 48 986 women. JAMA Surg 2021;156(7):628–37.

[27] De Lorenzi F, Borelli F, Pagan E, Bagnardi V, Peradze N, Jereczek-Fossa BA, et al. Oncoplastic breast-conserving surgery for synchronous multicentric and multifocal tumors: is it oncologically safe? A retrospective matched-cohort analysis. Ann Surg Oncol 2022;29(1):427–36.

[28] Weber WP, Shaw J, Pusic A, Wyld L, Morrow M, King T, et al. Oncoplastic breast consortium recommendations for mastectomy and whole breast reconstruction in the setting of post-mastectomy radiation therapy. Breast 2022;63:123–39.

[29] Freitas-Junior R, Ferreira-Filho D, Soares L, Paulinelli R. Oncoplastic breast-conserving surgery in low- and middle-income countries : training surgeons and bridging the gap. Glob Breast Cancer Rep 2019;11:136–42.

[30] Jagsi R, Momoh AO, Qi J, Hamill JB, Billig J, Kim HM, et al. Impact of radiotherapy on complications and patient-reported outcomes after breast reconstruction. J Natl Cancer Inst 2018;110(2).

[31] Mortada H, AlNojaidi TF, AlRabah R, Almohammadi Y, AlKhashan R, Aljaaly H. Morbidity of the donor site and complication rates of breast reconstruction with autologous abdominal flaps: a systematic review and meta-analysis. Breast J 2022;2022:7857158.

[32] Saldanha IJ, Broyles JM, Adam GP, Cao W, Bhuma MR, Mehta S, et al. Autologous reconstruction after mastectomy for breast cancer. Plast Reconstr Surg Glob Open 2022;10(3):e4181.

[33] Nelson JA, Cordeiro PG, Polanco T, Shamsunder MG, Patel A, Allen RJ, et al. Association of radiation timing with long-term satisfaction and health-related quality of life in prosthetic breast reconstruction. Plast Reconstr Surg 2022;150(1):32e–41e.

[34] Retrouvey H, Zhong T, Gagliardi AR, Baxter NN, Webster F. How ineffective interprofessional collaboration affects delivery of breast reconstruction to breast cancer patients: a qualitative study. Ann Surg Oncol 2020;27(7):2299–310.

[35] Metcalfe KA, Retrouvey H, Kerrebijn I, Butler K, O'Neill AC, Cil T, et al. Predictors of uptake of contralateral prophylactic mastectomy in women with nonhereditary breast cancer. Cancer 2019;125(22):3966–73.

[36] Cipora E, Konieczny M, Karwat ID, Roczniak W, Babuśka-Roczniak M. Surgical method of treatment and level of satisfaction with life among women diagnosed

with breast cancer, according to time elapsed since performance of surgery. Ann Agric Environ Med 2018;25(3):453–9.
[37] Franceschini G, Masetti R. Evidence-based surgery to realize a successful extreme oncoplastic breast conservation. Eur J Surg Oncol 2020;46(5):924–5.
[38] Paulinelli RR, Ribeiro LFJ, Santos TD, Caires EMS, Pontes MGM, Faria BM, et al. Oncoplastic Mammoplasty with disguised geometric compensation. Surg Oncol 2021;39:101660.
[39] Resende Paulinelli R, de Oliveira VM, Bagnoli F, Letzkus Berríos J, Cézar Chade M, Bragatto Picoli L, et al. Oncoplastic mammaplasty with geometric compensation: evolution of the technique, outcomes and follow-up in a multicentre retrospective cohort. J Surg Oncol 2020;121(6):967–74.
[40] Fitzal F, Bolliger M, Dunkler D, Geroldinger A, Gambone L, Heil J, et al. Retrospective, multicenter analysis comparing conventional with oncoplastic breast conserving surgery: oncological and surgical outcomes in women with high-risk breast cancer from the OPBC-01/iTOP2 study. Ann Surg Oncol 2022;29(2):1061–70.
[41] Freitas-Junior R, Faria SS, Paulinelli RR, Martins E. Trends in oncoplastic breast surgery and breast reconstruction over the past 35 years. Breast J 2018;24(3):432–4.