21 Patient Selection, Tips and Tricks, and General Description of Oncoplastic Breast Surgery

Sherif F. Naguib

21.1 Introduction

Breast-conserving surgery (BCS) has long become a well-established alternative to mastectomy in the treatment of early breast cancer. However, in the case of larger lesions, small-sized breasts, or medial/lower/central quadrant lumpectomies, achieving tumor-free margins may compromise the cosmetic outcome. Poor aesthetic results requiring surgical correction (Fig. 21.1) have been observed in up to 30% of patients undergoing BCS [1]. So, in an effort to overcome this problem, oncoplastic breast surgery (OBS) was introduced.

The term "oncoplastic breast surgery" (OBS) was coined in 1993 by Werner Audretsch [2] to describe the concept of integrating oncologic surgical principles with plastic surgical techniques aiming to combine adequate tumor-free margins with optimal cosmetic outcomes.

In Europe, OBS usually refers to plastic procedures aiming to improve the results of BCS [3]. However, at present both Latin and Anglo-Saxon publications have adopted the classification system of John Bostwick III, where OBS includes (a) postmastectomy reconstruction whether immediate or delayed, (b) post-conservative surgery reconstruction, and (c) chest wall reconstruction in locally advanced or recurrent breast cancer [4].

21.2 Classification of OBS

For practical purposes, many classification systems for OBS have been suggested, namely, the Hoffman system [5], the Basel system [6], the Brazilian 4-class classification by Urban and colleagues [7], and the bi-level system by Clough and colleagues [8], the latter being the most popular.

21.2.1 Bi-level Classification

In 2010, Clough and colleagues [8] classified OBS into two levels (Table 21.1).

1. *Level I* procedures address <20% volume resection. Following skin incision, the skin and/or nipple-areolar complex (NAC) are undermined, the full glandular thickness is resected, and the glandular tissue is re-approximated. This technique is appropriate for smaller volume resections and will not affect the position of NAC [8–11].
2. *Level II* procedures are used for cases requiring >20% volume resections or for patients with ptosis or glandular atrophy. They are more complex and are based on two different concepts: volume displacement and volume replacement [8–11].

S. F. Naguib (✉)
Dept. of Surgery, NCI - Cairo University, Cairo, Egypt

M. Rezai et al. (eds.), *Breast Cancer Essentials*, https://doi.org/10.1007/978-3-030-73147-2_21

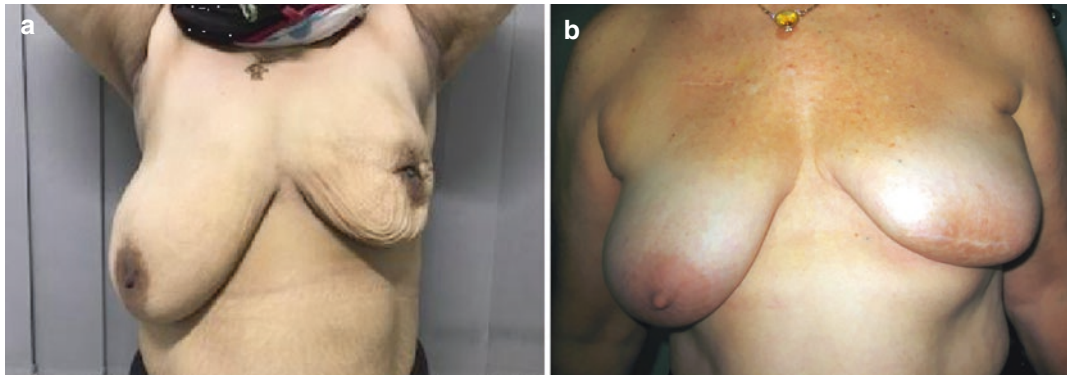

Fig. 21.1 Poor aesthetic results following BCS: (**a**) Large excision, (**b**) central quadrantectomy

Table 21.1 Oncoplastic decision guide: bi-level classification of OBS [8]

Criteria	Level I	Level II
Maximum excision volume ratio	20%	20–50%
Requirement of skin excision for reshaping	No	Yes
Mammoplasty	No	Yes
Glandular characteristics	Dense	Dense or fatty

21.2.1.1 Volume Displacement Procedures

The surgeon re-arranges the remaining breast tissue to reconstruct the lumpectomy defect using dermo-glandular flap advancement, rotation or transposition, and breast reducing techniques. These procedures are suitable for patients with medium to large breasts, with dense glandular tissue and when the excised volume does not exceed 10% of the breast volume for medial tumors or 20% for tumors situated laterally. It is particularly appropriate for tumors located in lateral and superior quadrants (Fig. 21.2) [11]. NAC displacement can be prevented by de-epithelialization of the periareolar skin in the shape of a crescent as opposed to the defect site. Contralateral breast symmetrization is usually required [9–12].

The use of reduction mammoplasty is indicated for 20–50% breast volume excision and is particularly appropriate for tumors located in unfavorable locations such as central, upper-inner, and lower quadrants especially in patients with heavy ptotic breasts or symptomatic macromastia who will largely benefit from a bilateral breast reduction. Scarring of both breasts could be worrisome to some patients [13].

21.2.1.2 Volume Replacement Procedures

The surgeon uses autologous tissue from an extramammary site (usually myocutaneous, myosubcutaneous, or faciocutaneous flaps), lipo-filling, or a breast implant to reconstruct the breast (Fig. 21.3).

These procedures are suitable for patients who wish to avoid contralateral surgery, those with small- to medium-sized breasts with minimal ptosis, for tumors located in any site and for 20–50% breast volume excision [9–12, 14]. Scarring in the breast and the donor site (e.g. back) could be worrisome to some patients [13].

21.3 Patient Selection

The British Association of Surgical Oncology (BASO) and the British Association of Plastic Surgeons (BAPS) published their guidelines addressing adequate patient selection for OBS [15].

21.3.1 Indications for OBS

OBS should be considered in all patients where adequate local excision cannot be accomplished

Fig. 21.2 Example of a displacement procedure, The Benelli technique: (**a**) preoperative design for an upper outer quadrant tumor, (**b**) de-epithelialization of periareolar skin donut, and (**c**) immediate postoperative result after the closure of the defect

Fig. 21.3 Example of a replacement procedure, the latissimus dorsi myocutaneous flap (LDMF): (**a**) preoperative design for a retroareolar tumor, (**b**) central quadrantectomy, and (**c**) immediate postoperative result after insertion of the LDMF

without significant risk of breast deformity. This is frequently encountered with:

(a) Resection of >20% of the breast volume
(b) Central, medial, and lower quadrant resections
(c) Axillary dissection through lumpectomy incision
(d) Periareolar incisions in inferior quadrants
(e) Incomplete mobilization of breast parenchyma to allow reshaping of the breast

Other indications include women with macromastia or severe ptosis who wish for breast reduction/lifting in addition to tumor extirpation [16].

21.3.2 Contraindications for OBS

OBS should be avoided when [12, 16]:

(a) Clear margins cannot be achieved without mastectomy.
(b) T4 tumors.
(c) Multicentric disease.
(d) Extensive malignant mammographic microcalcification.
(e) Inflammatory carcinoma.

Other relative contraindications include obesity [17], small breasts and breasts without ptosis, previously irradiated breasts, large skin resections beyond the mammoplasty area, smokers, diabetics and patients having exaggerated expectations with aesthetic results [16]. Old age by itself should not be a contraindication for OBS since physiological function rather than chronological age was found to be a more accurate predictor for postoperative outcome [18, 19].

21.4 Technique Selection

Until today there is no universal agreement as to the best oncoplastic technique to be used. In an attempt to simplify the surgeon's task, the Institut Curie group [11] described a systematic

Table 21.2 Classification of level II OBS techniques according to tumor location [8–12, 20–29]

Location	Recommended procedures
Upper pole	• Inferior pedicle inverted-T mammoplasty [20] • Benelli round block [21] • Batwing mastopexy [22]
Upper outer quadrant	• Lateral (Racquet) mammoplasty [23] • Radial oblique incision • Benelli round block [21]
Lower outer quadrant	• Superior pedicle inverted-T mammoplasty [8] • J-mammoplasty [24]
Lower pole	• Superior pedicle inverted-T mammoplasty [8] • Vertical scar mammoplasty [25, 26] • IMF-plasty [27]
Lower inner quadrant	• Superior pedicle inverted-T mammoplasty [8] • V-mammoplasty [28]
Upper inner quadrant	• Benelli round block [21] • Batwing mastopexy [22]
Central quadrant	• Periareolar excision closed in a straight horizontal line or in a purse-string manner • Inverted-T/vertical-scar mammoplasty with/without NAC resection • Grisotti technique [29]

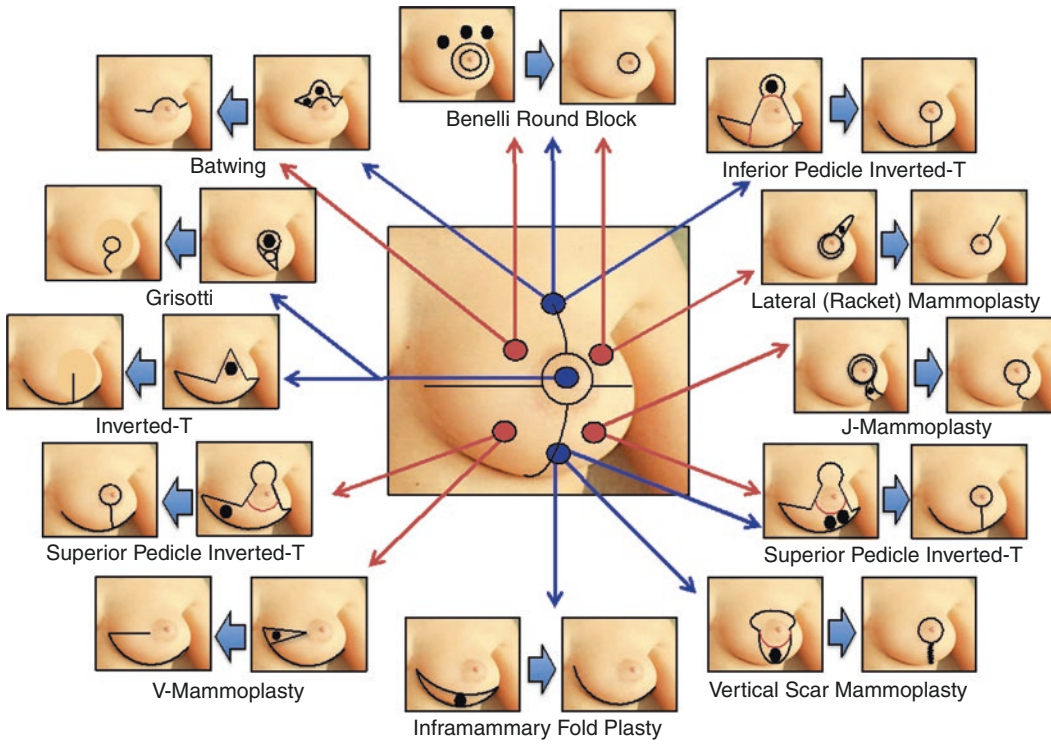

Fig. 21.4 Oncoplastic displacement techniques applicable to different regions of the breast

approach comprising nine basic techniques suitable for all patients. Similarly, Clough and colleagues [8] devised an Atlas based on a quadrant-per-quadrant approach to oncoplastic procedures. Table 21.2 and Fig. 21.4 illustrate some of the different oncoplastic displacement techniques applicable to different regions of the breast.

21.5 Tips and Tricks in OBS

21.5.1 Preoperative Evaluation

Before proceeding with oncoplastic surgery, the patient should carefully be assessed regarding the following aspects [30–32]:

- Tumor size and location
- Skin/ NAC involvement
- Breast size, degree of ptosis, and glandular density
- Patient-related risk factors, notably obesity, smoking, diabetes, autoimmune disease, and previous breast surgery or irradiation.
- Patient's expectations
- The need for adjuvant therapies.

21.5.2 Patient Prepping and Positioning

All patients should be marked in the standing position before surgery. Midline, lateral, and inframammary breast folds and breast meridians should be outlined. Furthermore tumor location, both current and future nipple position, planned skin incisions, and dermo-glandular pedicles should all be marked [33]. The patient is then anesthetized in the supine position with symmetric shoulder and arm height. Both arms are abducted at 90°, padded, and wrapped properly. The patient's waist should be accurately adjusted over the break in the operating table to allow for seating her up when needed [34].

21.5.3 Required Instruments

A good light source like a headlamp or various lighted retractors will ensure adequate visualization. An extended electrocautery tip and longer scissors or scalpel may also be needed. A "cookie cutter" (areolatome) can help in marking the areola if de-epithelialization is required [35].

21.5.4 Incision Placement

Incision choice should incorporate ease and accessibility together with a resulting inconspicuous scar. Radial incisions are better used in the lower quadrants of the breast while circumareolar incisions are more appropriate in the upper half. In fact, a circumareolar incision in the inferior part may cause an ugly crease between the areola and the inframammary fold (double bubble profile). On the other hand, a radial incision in the upper part of the breast may leave a visible scar above the décolleté line [36]. Circumareolar, inframammary, and axillary incisions usually result in esthetically pleasant scars [30]; however, skin involvement by cancer requiring skin resection may limit the surgeon's choice of incision [35].

21.5.5 Dissection and Mobilization

Depending on the depth of the tumor and the surgeon's preference, various dissection planes can be used, namely, superficial, mid-depth, or posterior (pre-pectoral or subglandular) plane [30]. The superficial plane is called the *oncoplastic plane*, and it lies immediately above the anterior mammary fascia, between subcutaneous fat and breast parenchyma. In patients in whom this plane is not well visualized, mammographic pictures may serve as a guide to its depth (Fig. 21.5) [35].

When the tumor is approached, dissection is widened in the same plane medially, laterally, and beyond the lesion to approximately 3–5 times the width of the latter (Fig. 21.6). This maneuver improves visualization of the lesion, creates a space for adequate excision, and mobilizes the surrounding glandular tissue for satisfactory reapproximation avoiding tethering of the overlying skin [30].

Closure of the lumpectomy defect is mandatory, especially in the lower half of the breast, and is facilitated by glandular undermining. On the contrary, in the upper pole, defect closure is not essential [36]. Dual-plane undermining (from the

skin and pectoralis) can be undertaken with impunity in dense glandular breasts (BI-RADS 3/4). However, in low-density fatty breasts (BI-RADS 1/2), this maneuver carries a higher risk of fat necrosis, and therefore only posterior undermining is advised [37].

21.5.6 Contralateral Symmetrization

It is assumed that OBS of the index breast, especially with displacement techniques, will result in breast asymmetry requiring correction of the contralateral breast [9]. Contralateral reduction may not be solely cosmetic as it may help in the accidental discovery of occult malignancies in the opposite breast in 0.16–5% of the cases [38–41]; also there is evidence that breast reduction substantially decreases breast cancer incidence over the age of 50 years [42].

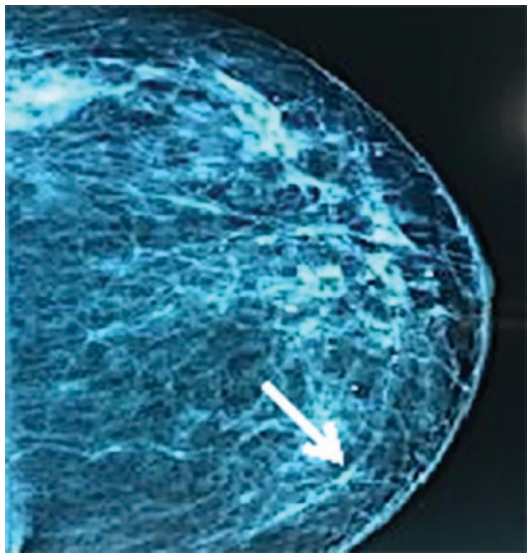

Fig. 21.5 The oncoplastic plane on mammography

The timing of symmetrization, whether immediate or delayed, is subject to debate and should be discussed with the patient. The Institut Curie group [43] recommended delaying contralateral correction for 3–6 months after completion of adjuvant therapy because the index breast may suffer a variable degree of fibrosis and volume loss in response to radiotherapy (Fig. 21.7) [9]. Additionally, chemo- and hormonal therapy may significantly alter the patient's overall weight and thereby breast volume [43]. Moreover, if subsequent re-excision or mastectomy is required because of positive excision margins, an immediate contralateral reconstruction procedure could prove inadequate [22].

Nevertheless, when offered the option of having two successive surgeries separated by 1–2 years, many patients will opt for immediate symmetrization to avoid a second surgery and avert living with unpleasant breast disparity for a variable period of time**.** Moreover, little benefit was shown with a delayed procedure since this is neither easier nor its results more predictable [9, 44].

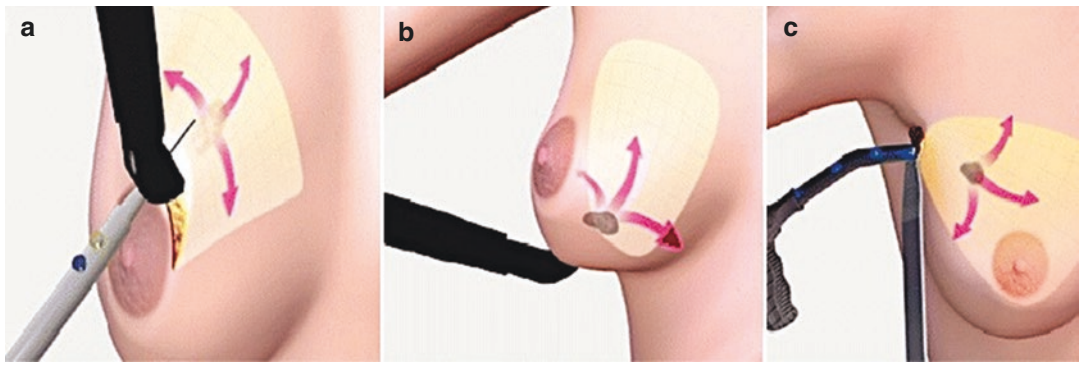

Fig. 21.6 Extension of dissection plane approximately 3–5x the width of the tumor: (**a**) peri-areolar incision, (**b**) IMF incision, (**c**) axillary incision [30]

Fig. 21.7 Severe shrinkage and fibrosis 9 months after bilateral inverted-T mammoplasty and postoperative radiotherapy requiring re-correction of the contralateral breast

21.5.7 Additional Procedures at the End of Operation

Prior to closure, hemoclips should be placed at the edges of the lumpectomy cavity to mark the tumor bed, allowing for accurate planning of booster dose by the radiation oncologist. After closure, and with the patient in the supine position, the surgeon should move to the head then to the feet of the patient to compare the shape and projection of both breasts and bilateral areolar position. Then, with the patient in the sitting position, the surgeon should move to her feet to evaluate the final symmetry of the breasts [36]. Finally, to reduce seroma formation, a compressive bandage or one of the various front-zip compression bras is recommended [45].

21.6 Oncologic Results of OBS

21.6.1 Margin Involvement

In two different systematic reviews [46, 47] including 88 and 40 studies each, margin involvement ranged from 7 to 22% and 0 to 36%, respectively. However, OBS was found more likely to result in negative margins when compared to partial mastectomy. Giacalone et al. [48] observed that oncoplastic surgery could achieve 5–10 mm free margins in a significantly higher percentage of cases compared to BCS alone.

It has been demonstrated that approximately half as many patients undergoing OBS require re-excision because of positive margins when compared to BCS alone (12.0% vs. 25.9%, respectively; $P = 0.01$) and fewer deserve completion mastectomy (2.4% vs. 9.4%, respectively; $P = 0.05$) [49, 50].

21.6.2 Local Recurrence

In their systematic reviews, Haloua et al. [46] and Yiannakopoulou et al. [47] noted that local recurrence rates (LRR) with OBS ranged from 0 to 7% and 0 to 10.8%, respectively. Other studies reported lower LRR ranging from 1.5 to 3% [41, 51, 52].

When compared with partial mastectomy, OBS has lower LRR (4% vs. 7%) as demonstrated by many studies [53]. However, Fitoussi et al. [33] described higher rates of LRR with OBS (6.8% vs. 2–5%) and advocated that this was partly due to the greater difficulty in administering radiation boost to the tumor bed, thence the importance of clip marking of the lumpectomy cavity by the surgeon.

21.6.3 Survival Rates

There is robust evidence that OBS provides excellent disease-free survival (DFS) (96% at 7 years) [54]. In a study comparing OBS and partial mastectomy in respect to patient survival, there was no statistically significant difference in overall survival (91.4% vs. 91.3% at 10 years). Nevertheless, in the oncoplastic group, the DFS was slightly lower (69% vs.73.1% at 10 years), but the noted difference was not statistically significant [55].

21.7 Cosmetic Results of OBS

Aesthetic results after OBS were found to be good to excellent in 78 to 89.5% of patients [46, 53, 56], and cosmetic satisfaction was

Fig. 21.8 Cosmetic results following OBS: (**a**) right Grisotti technique, (**b**) bilateral therapeutic mammoplasty, and (**c**) latissimus dorsi myocutaneous flap after left upper outer quadrant lumpectomy

significantly higher with OBS compared to partial mastectomy (89.5% vs. 82.9%, $P < 0.001$) (Fig. 21.8) [54]. Moreover, Veiga et al. [57] reported that patients who underwent therapeutic reduction mammoplasty had better self-esteem and mental health when compared with those who underwent partial mastectomy alone.

21.8 Complications of OBS

The National Surgical Quality Improvement Program (NSQIP) database [58] confirms that OBS does not considerably increase the risk of surgical complications, despite the longer operative time. The rate of complications was reported to range between 8.5 and 10.8% [33, 41]. In a recently published meta-analysis [53], the complication rate with reduction mammoplasty was 16% and with flap reconstruction 14%. Nevertheless, higher rates (15–30%) were reported by Clough et al. [59], but these were still favorably comparable to the reported 24% complication rate with BCS alone [60].

Early complications include delayed healing, hematoma, seroma, infection, and skin and NAC necrosis, while late complications include keloids, fibrosis, and fat necrosis [43]. In volume displacement, fat necrosis is a worrisome issue due to the greater glandular mobilization, particularly when dual-plane dissection is undertaken in a fatty breast [8]. Complications specific to volume replacement techniques include donor site morbidity and the risk of partial or complete flap loss [31].

The complications arising after OBS might prolong patient recovery, raising concerns about postponing adjuvant therapy. However, in most studies [53, 59, 61], no significant delay was reported. Only Clough et al. [59] reported delayed initiation of adjuvant treatment in 4.6% of their patients due to complications.

21.9 Evolving Trends in OBS

21.9.1 Extreme Oncoplasty

Extreme oncoplasty is a breast-conserving operation, using oncoplastic techniques, in patients who would normally require mastectomy, namely, those with large (>5 cm), locally advanced, multifocal, or multicentric tumors. Most of these patients will need postoperative radiotherapy, even with mastectomy [9].

In these patients, oncoplastic reconstruction is preferable to mastectomy with immediate reconstruction and radiation therapy because it generally yields a better cosmetic result with less operative and postoperative morbidity [62, 63].

21.9.2 Onco-aesthetic Surgery

Onco-aesthetic surgery is a new concept that was recently introduced in the modern management of breast cancer [64]. It addresses a large number of women with breast cancer who are not content with their breast size and shape before surgery and in whom maintaining breast form at the time

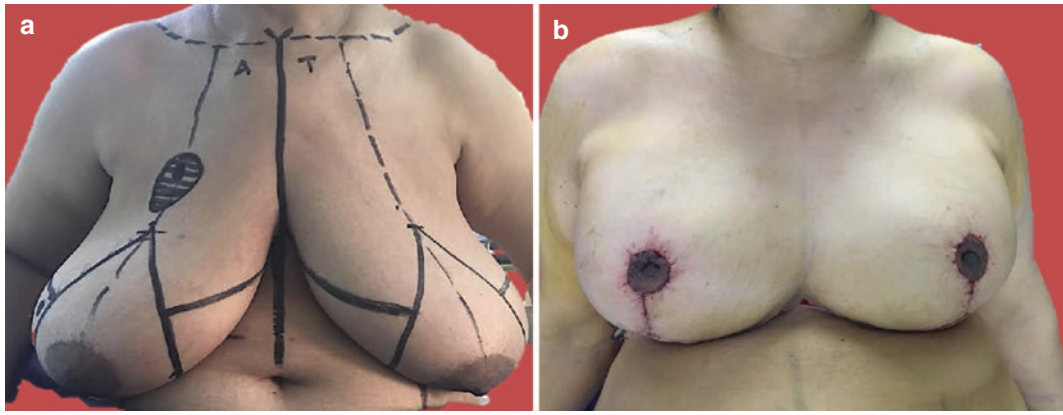

Fig. 21.9 Onco-aesthetic surgery: inverted-T therapeutic mastopexy in a patient with macromastia and right breast cancer. (**a**) Preoperative design, (**b**) postoperative result

of tumor ablation may not be the ideal solution. Breast reduction for macromastia (Fig. 21.9), therapeutic mastopexy for ptosis, and augmentation reconstruction (with contralateral symmetrization) for small breasts could all be considered in those patients with breast cancer who wish to improve their image [44].

21.10 Conclusions

Women today have become more demanding as regards their feminine figure after breast cancer treatment. That is why the present goal of breast cancer treatment should exceed an oncologically adequate tumor eradication to achieve a satisfactory cosmetic appearance.

Currently, OBS with local tissue rearrangement, flap reconstruction, or mammoplasty techniques is a highly valuable tool in the comprehensive management of breast cancer, and it should be offered to all eligible patients.

A thorough understanding of these procedures and careful assessment of the patient, her tumor size and location, and breast morphology will allow proper selection of patients and surgical techniques.

OBS has improved the oncologic and cosmetic results of partial mastectomy. Its complications are equivalent to BCS and will rarely cause any delay in adjuvant treatment. However, the surgeon should never compromise oncological safety in exchange for achieving aesthetic perfection.

References

1. Clough KB, Cuminet J, Fitoussi A, Nos C, Mosseri V. Cosmetic sequelae after conservative treatment for breast cancer: classification and results of surgical correction. Ann Plast Surg. 1998;41(5):471–81.
2. Audretsch WP. Onco-plastic surgery: “target” volume reduction (BCT-mastopexy), lumpectomy reconstruction (BCT-reconstruction) and flap-supported operability in breast cancer. In: Proceedings 2nd European Congress on Senology, October 2–6, 1994; Vienna/Bologna: Moncuzzi; 1994. pp. 139–157.
3. Petit JY, Rietjens M, Lohsiriwat V, Rey P, Garusi C, De Lorenzi F, Martella S, Manconi A, Barbieri B, Clough KB. Update on breast reconstruction techniques and indications. World J Surg. 2012;36(7):1486–97.
4. Zucca-Matthes G, Manconi A, da Costa Viera RA, Michelli RA, Matthes AD. The evolution of mastectomies in the oncoplastic breast surgery era. Gland Surg. 2013;2(2):102.
5. Hoffmann J, Wallwiener D. Classifying breast cancer surgery: a novel, complexity-based system for oncological, oncoplastic and reconstructive procedures, and proof of principle by analysis of 1225 operations in 1166 patients. BMC Cancer. 2009;9(1):108.
6. Weber WP, Soysal SD, El-Tamer M, Sacchini V, Knauer M, Tausch C, Hauser N, Günthert A, Harder Y, Kappos EA, Schwab F. First international consensus research and treatment. 2017;165(1):139–49.
7. Urban C, Lebovic G. S24 oncoplastic surgery: overview and recommendations for training. Breast. 2011;20:S9–S10.
8. Clough KB, Kaufman GJ, Nos C, Buccimazza I, Sarfati IM. Improving breast cancer surgery: a classification

and quadrant per quadrant atlas for oncoplastic surgery. Ann Surg Oncol. 2010;17(5):1375–91.
9. Savalia NB, Silverstein MJ. Oncoplastic breast reconstruction: patient selection and surgical techniques. J Surg Oncol. 2016;113(8):875–82.
10. Bertozzi N, Pesce M, Santi PL, Raposio E. Oncoplastic breast surgery: comprehensive review. Eur Rev Med Pharmacol Sci. 2017;21(11):2572–85.
11. Berry MG, Fitoussi AD, Curnier A, Couturaud B, Salmon RJ. Oncoplastic breast surgery: a review and systematic approach. J Plast Reconstr Aesthet Surg. 2010;63(8):1233–43.
12. Franceschini G, Terribile DA, Magno ST, Fabbri C, Accetta CR, Di Leone A, Moschella F, Barbarino R, Scaldaferri AS, Darchi S, Carvelli ME. Update on oncoplastic breast surgery. Eur Rev Med Pharmacol Sci. 2012;16(11):1530–40.
13. Rainsbury RM. Surgery insight: oncoplastic breast-conserving reconstruction—indications, benefits, choices and outcomes. Nat Rev Clin Oncol. 2007;4(11):657.
14. Sanidas EE, Fitzal F. Oncoplastic breast-conserving therapy. In: Breast cancer management for surgeons. Cham: Springer; 2018. p. 229–44.
15. Cutress RI, Summerhayes C, Rainsbury R. Guidelines for oncoplastic breast reconstruction. Ann R Coll Surg Engl. 2013;95(3):161–2.
16. Urban C, Lima R, Schunemann E, Spautz C, Rabinovich I, Anselmi K. Oncoplastic principles in breast conserving surgery. Breast. 2011;20:S92–5.
17. Choban PS, Flancbaum L. The impact of obesity on surgical outcomes: a review. J Am Coll Surg. 1997;185(6):593–603.
18. James R, McCulley SJ, Macmillan RD. Oncoplastic and reconstructive breast surgery in the elderly. Br J Surg. 2015;102(5):480–8.
19. Muss HB, Busby-Whitehead J. Older women with breast cancer: slow progress, great opportunity, now is the time. J Clin Oncol. 2011;29(35):4608–10.
20. Robbins TH. A reduction mammaplasty with the areola-nipple based on an inferior dermal pedicle. Plast Reconstr Surg. 1977;59(1):64–7.
21. Benelli L. A new periareolar mammaplasty: the "round block" technique. Aesthet Plast Surg. 1990;14(1):93–100.
22. Anderson BO, Masetti R, Silverstein MJ. Oncoplastic approaches to partial mastectomy: an overview of volume-displacement techniques. Lancet Oncol. 2005;6(3):145–57.
23. Ballester M, Berry MG, Couturaud B, Reyal F, Salmon RJ, Fitoussi AD. Lateral mammaplasty reconstruction after surgery for breast cancer. Br J Surg. 2009;96(10):1141–6.
24. Elbaz JS. Technic of mammoplasty by a J cicatrix. Annales de chirurgie plastique. 1975;20(2):101.
25. Lejour M, Abboud M, Declety A, Kertesz P. Reduction of mammaplasty scars: from a short inframammary scar to a vertical scar. Annales de chirurgie plastique et esthetique. 1990;35(5):369–79.
26. Lassus C. A 30-year experience with vertical mammaplasty. Plast Reconstr Surg. 1996;97(2):373–80.
27. Fitoussi A, Couturaud B, Salmon R. Chirurgie oncoplastique et reconstruction dans le cancer du sein: Techniques et indications. L'expérience de l'Institut Curie. Springer Science & Business Media; 2008.
28. Clough KB, Oden S, Ihrai T, Massey E, Nos C, Sarfati I. Level 2 oncoplastic surgery for lower inner quadrant breast cancers: the LIQ-V mammoplasty. Ann Surg Oncol. 2013;20(12):3847–54.
29. Galimberti V, Zurrida S, Luini A, Greco M, Zanini V, Callegari M, Grisotti A, Veronesi P, Catania S. Central small size breast cancer: how to overcome the problem of nipple and areola involvement. Eur J Cancer. 1993;29(8):1093–6.
30. Mitchell SD. A step-by-step oncoplastic breast conservation surgical atlas of reproducible dissection techniques and anatomically ideal incision placement. Breast Cancer Res Treat. 2017;165(3):505–16.
31. Mansfield L, Agrawal A, Cutress RI. Oncoplastic breast conserving surgery. Gland Surg. 2013;2(3):158–62.
32. Kassira W, Kassira N, Panthaki Z, Tozman E, McDonald WS. Perioperative considerations in the autologous breast reconstruction patient with systemic lupus erythematosus. Ann Plast Surg. 2005;54(4):442–4.
33. Fitoussi AD, Berry MG, Fama F, Falcou MC, Curnier A, Couturaud B, Reyal F, Salmon RJ. Oncoplastic breast surgery for cancer: analysis of 540 consecutive cases [outcomes article]. Plast Reconstr Surg. 2010;125(2):454–62.
34. Habibi M, Broderick KP, Sebai ME, Jacobs LK. Oncoplastic breast reconstruction: should all patients be considered? Surg Oncol Clin. 2018;27(1):167–80.
35. Kopkash K, Clark P. Basic oncoplastic surgery for breast conservation: tips and techniques. Ann Surg Oncol. 2018;25(10):2823–8.
36. Petit JY, De Lorenzi F, Rietjens M, Intra M, Martella S, Garusi C, Rey PC, Matthes AG. Technical tricks to improve the cosmetic results of breast-conserving treatment. Breast. 2007;16(1):13–6.
37. Clough KB, Soussaline M, Campana F, Salmon RJ. Mammoplasty combined with irradiation: conservative treatment of breast cancer localized in the lower quadrant. Annales de chirurgie plastique et ésthetique. 1990;35(2):117–22.
38. Chang E, Johnson N, Webber B, Booth J, Rahhal D, Gannett D, Johnson W, Franzini D, Zegzula H. Bilateral reduction mammoplasty in combination with lumpectomy for treatment of breast cancer in patients with macromastia. Am J Surg. 2004;187(5):647–51.
39. Kakagia D, Fragia K, Grekou A, Tsoutsos D. Reduction mammaplasty specimens and occult breast carcinomas. Eur J Surg Oncol. 2005;31(1):19–21.
40. Petit JY, Rietjens M, Contesso G, Bertin F, Gilles R. Contralateral mastoplasty for breast reconstruction: a good opportunity for glandular exploration

and occult carcinomas diagnosis. Ann Surg Oncol. 1997;4(6):511–5.
41. Rietjens M, Urban CA, Rey PC, Mazzarol G, Maisonneuve P, Garusi C, Intra M, Yamaguchi S, Kaur N, De Lorenzi F, Matthes AG. Long-term oncological results of breast conservative treatment with oncoplastic surgery. Breast. 2007;16(4):387–95.
42. Boice JD Jr, Persson I, Brinton LA, Hober M, McLaughlin JK, Blot WJ, Fraumeni JF Jr, Nyrén O. Breast cancer following breast reduction surgery in Sweden. Plast Reconstr Surg. 2000;106(4):755–62.
43. Staub G, Fitoussi A, Falcou MC, Salmon RJ. Breast cancer surgery: use of mammaplasty. Results. Series of 298 cases. Annales de chirurgie plastique et esthetique. 2008;53(2):124–34.
44. Macmillan RD, McCulley SJ. Oncoplastic breast surgery: what, when and for whom? Curr Breast Cancer Rep. 2016;8(2):112–7.
45. Dharmawan R, Nagalingam S, Tay L, Wong C, Tan B. The use of compression belt in the prevention of seroma formation post- breast cancer surgery: a randomized trial. In: Paper presented at the Milan Breast Cancer Conference 2013; Milan.
46. Haloua MH, Krekel NM, Winters HA, Rietveld DH, Meijer S, Bloemers FW, van den Tol MP. A systematic review of oncoplastic breast-conserving surgery: current weaknesses and future prospects. Ann Surg. 2013;257(4):609–20.
47. Yiannakopoulou EC, Mathelin C. Oncoplastic breast conserving surgery and oncological outcome: systematic review. Eur J Surg Oncol. 2016;42(5):625–30.
48. Giacalone PL, Roger P, Dubon O, El Gareh N, Rihaoui S, Taourel P, Daurés JP. Comparative study of the accuracy of breast resection in oncoplastic surgery and quadrantectomy in breast cancer. Ann Surg Oncol. 2007;14(2):605–14.
49. Losken A, Pinell-White X, Hart AM, Freitas AM, Carlson GW, Styblo TM. The oncoplastic reduction approach to breast conservation therapy: benefits for margin control. Aesthet Surg J. 2014;34(8):1185–91.
50. Kaur N, Petit JY, Rietjens M, Maffini F, Luini A, Gatti G, Rey PC, Urban C, De Lorenzi F. Comparative study of surgical margins in oncoplastic surgery and quadrantectomy in breast cancer. Ann Surg Oncol. 2005;12(7):539–45.
51. Caruso F, Catanuto G, De Meo L, Ferrara M, Gallodoro A, Petrolito E, Trombetta G, Castiglione G. Outcomes of bilateral mammoplasty for early stage breast cancer. Eur J Surg Oncol. 2008;34(10):1143–7.
52. Chang EI, Peled AW, Foster RD, Lin C, Zeidler KR, Ewing CA, Alvarado M, Hwang ES, Esserman LJ. Evaluating the feasibility of extended partial mastectomy and immediate reduction mammoplasty reconstruction as an alternative to mastectomy. Ann Surg. 2012;255(6):1151–7.
53. Losken A, Dugal CS, Styblo TM, Carlson GW. A meta-analysis comparing breast conservation therapy alone to the oncoplastic technique. Ann Plast Surg. 2014;72(2):145–9.
54. Nizet JL, Maweja S, Lakosi F, Lifrange E, Scagnol I, Seidel L, Albert A, Jerusalem G. Oncological and surgical outcome after oncoplastic breast surgery. Acta Chir Belg. 2015;115(1):33–41.
55. De Lorenzi F, Hubner G, Rotmensz N, Bagnardi V, Loschi P, Maisonneuve P, Venturino M, Orecchia R, Galimberti V, Veronesi P, Rietjens M. Oncological results of oncoplastic breast-conserving surgery: long term follow-up of a large series at a single institution: a matched-cohort analysis. Eur J Surg Oncol. 2016;42(1):71–7.
56. Rezai M, Knispel S, Kellersmann S, Lax H, Kimmig R, Kern P. Systematization of oncoplastic surgery: selection of surgical techniques and patient-reported outcome in a cohort of 1035 patients. Ann Surg Oncol. 2015;22(11):3730–7.
57. Veiga DF, Veiga-Filho J, Ribeiro LM, Archangelo-Junior I, Mendes DA, Andrade VO, Caetano LV, Campos FS, Juliano Y, Ferreira LM. Evaluations of aesthetic outcomes of oncoplastic surgery by surgeons of different gender and specialty: a prospective controlled study. Breast. 2011;20(5):407–12.
58. Cil TD, Cordeiro E. Complications of oncoplastic breast surgery involving soft tissue transfer versus breast-conserving surgery: an analysis of the NSQIP database. Ann Surg Oncol. 2016;23(10):3266–71.
59. Clough KB, van la Parra RF, Thygesen HH, Levy E, Russ E, Halabi NM, Sarfati I, Nos C. Long-term results after oncoplastic surgery for breast cancer: a 10-year follow-up. Ann Surg. 2018;268(1):165–71.
60. Waljee JF, Hu ES, Newman LA, Alderman AK. Correlates of patient satisfaction and provider trust after breast-conserving surgery. Cancer. 2008;112(8):1679–87.
61. McIntosh J, O'Donoghue JM. Therapeutic mammaplasty–a systematic review of the evidence. Eur J Surg Oncol. 2012;38(3):196–202.
62. Behranwala KA, Dua RS, Ross GM, Ward A, A'hern R, Gui GP. The influence of radiotherapy on capsule formation and aesthetic outcome after immediate breast reconstruction using biodimensional anatomical expander implants. J Plast Reconstr Aesthet Surg. 2006;59(10):1043–51.
63. Boughey JC, Hoskin TL, Hartmann LC, Johnson JL, Jacobson SR, Degnim AC, Frost MH. Impact of reconstruction and reoperation on long-term patient-reported satisfaction after contralateral prophylactic mastectomy. Ann Surg Oncol. 2015;22(2):401–8.
64. Carmichael AR, Mokbel K. Evolving trends in breast surgery: oncoplastic to onco-aesthetic surgery. Arch Plast Surg. 2016;43(2):222.