Principles of Oncoplastic Surgery

BBSG – Brazilian Breast Study Group

Definition

Oncoplastic surgery (OP) is a major breakthrough in breast cancer surgery after sentinel lymph node consolidation. Approximately 30% of breast-conserving surgery (BCS) in the traditional model present late esthetic results considered unsatisfactory by patients and also have variable rates of reoperation due to compromised margins. The adoption of preventive measures with the integration of breast plastic surgery techniques into oncological surgery can modify this reality. Thus, OP is based on three fundamental principles: optimal cancer surgery, immediate contralateral homolateral reconstruction, and remodeling. This concept, initially limited to BCS, is also being applied in the immediate reconstruction after mastectomies with preservation of the skin and preservation of the nipple and areola complex (NAC).

General Principles

The basilar point of OP is to improve the quality of the life of patients with treatments that may be more effective from an aesthetic-functional point of view, without compromising oncological outcome. Figure 1 shows the main techniques described in breast surgery until the conception of OP, and in Fig. 2, the characteristics of the publications in the literature are shown. The most frequent residual deformities found after a BCS are:

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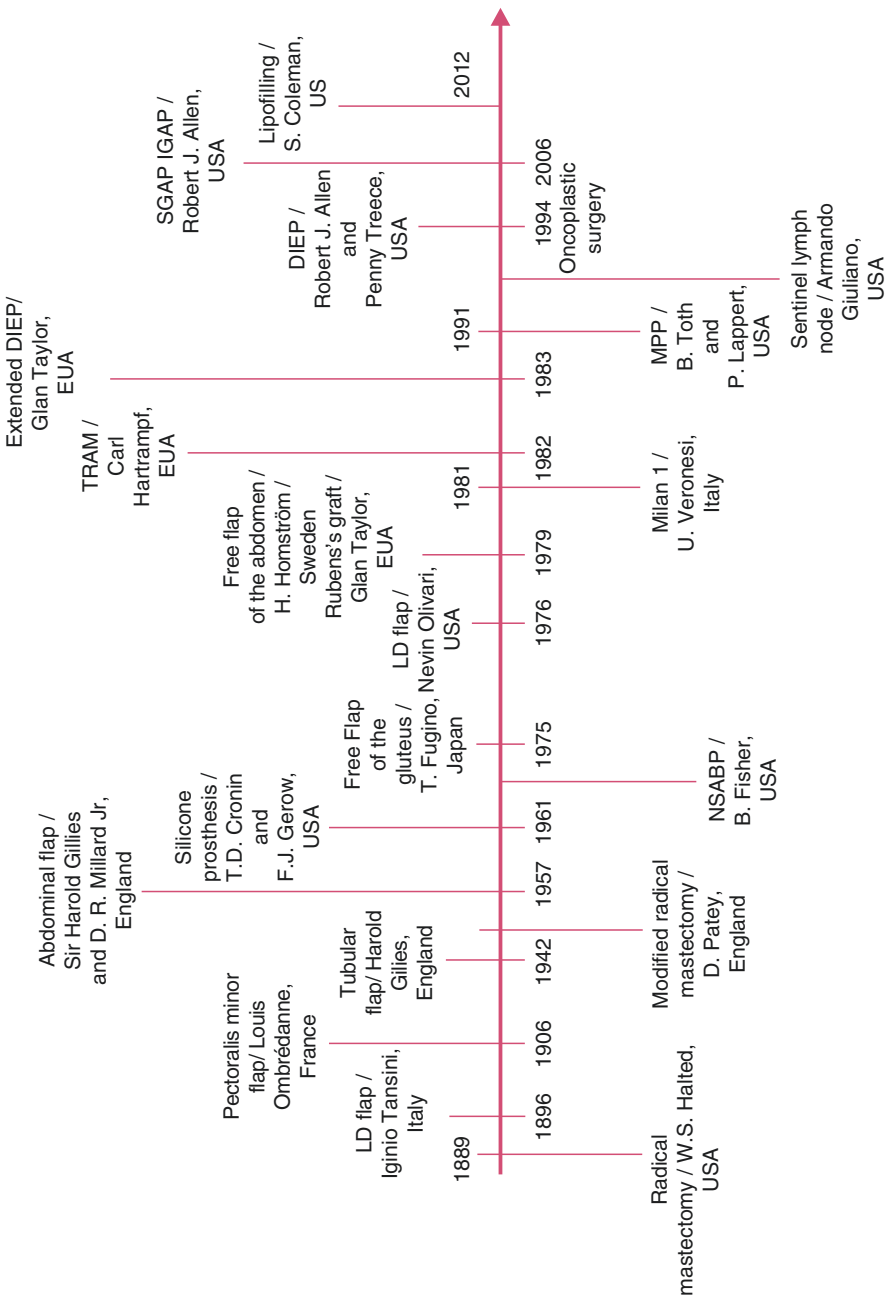
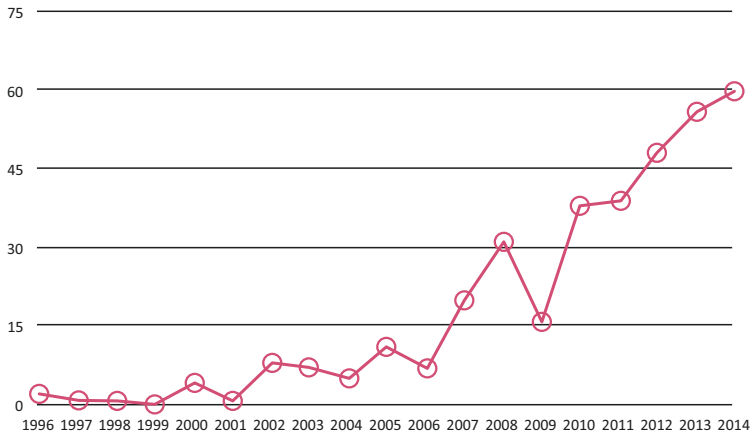


Fig. 1 Historical evolution of oncological and breast repair techniques



Characteristics	n(%)
Technical approaches	136 (38%)
Oncologic results	65 (18%)
Aesthetic results	15 (4%)
Satisfaction and quality of life	6 (2%)
Training	20 (6%)
Complications	7 (2%)
Review and others	107 (30%)

Fig. 2 Characteristics of publications in breast oncoplastic surgery. Source: PubMed 1996–2014. Access in 2014, Key-word (Title/Abstract): oncoplastic

- Deficiency of cutaneous-glandular tissue due to the resected breast volume and the late effects produced by radiotherapy
- Deformity of the NAC
- Reduction of ptosis and unilateral elevation of the inframammary fold as a consequence of fibrosis and retraction after radiotherapy

These changes are more evident in quadrantectomy than in tumorectomy and are related to the location of the tumor and its proximity to the NAC and the skin. The choice of the most appropriate technique for each patient should be made when anticipating the size and location of the defect, the proximity to the skin and to the NAC, and the clinical conditions of the patient (Fig. 3). Tables 1 and 2 show some practical recommendations that have been adopted to improve outcomes and to prevent complications. Patients should be guided by the existing limitations of a reconstructive surgery, which are greater than those existing in aesthetic procedures.

There are three possible situations for conducting OP in practice:

- Mastologist/breast surgeon with training in all breast repair techniques performs all reconstructions.
- Mastologist/breast surgeon performs most of the reconstructions but is associated with more complex cases with the plastic surgeon or mastologist with experience in reconstruction.
- Mastologist/breast surgeon and plastic surgeon work in all cases.

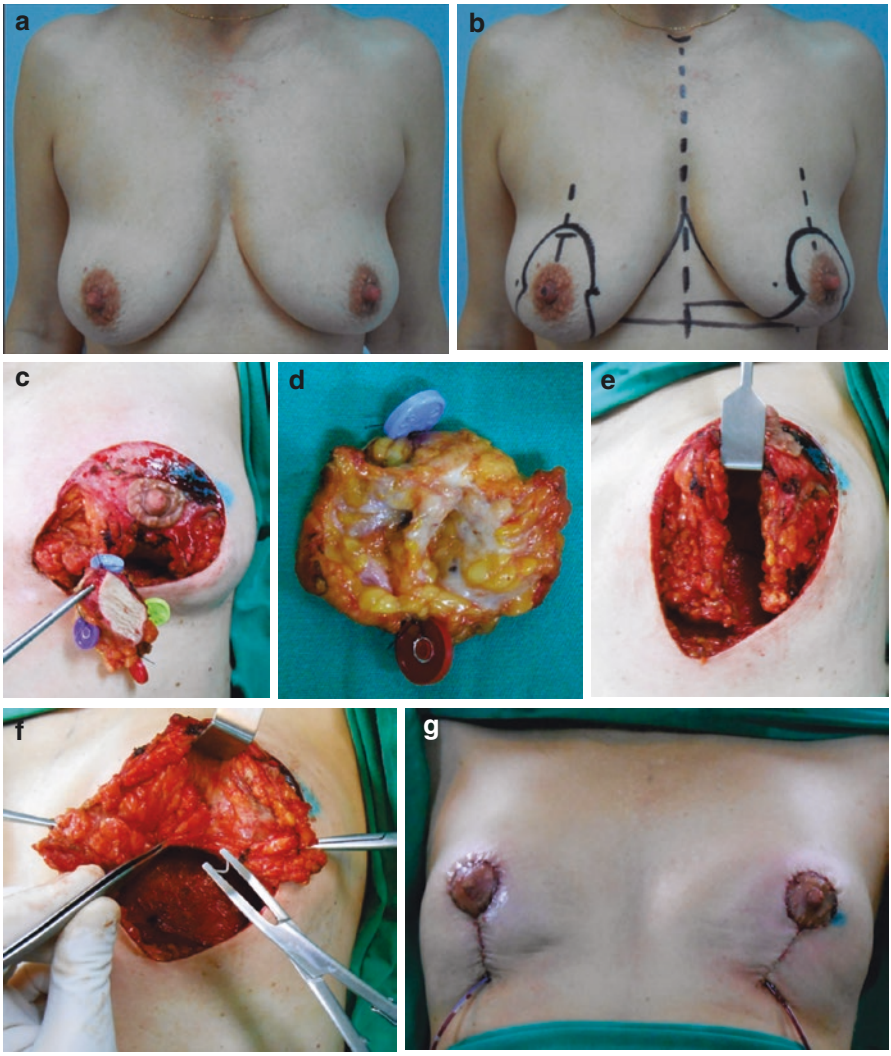


Fig. 3 Oncoplastic surgery of the breast step by step. (**a**): Preoperative patient's photo; (**b**) preoperative designs for upper pedicle; (**c**) tumor located at the junction of lower quadrants of the left breast; (**d**) demarcation of the margins; (**e**) pillars for breast reconstruction; (**f**) placement of radiotherapy clips; (**g**) immediate postoperative result after contralateral breast symmetrization

Main Techniques

The diversity of techniques that are used in breast aesthetic surgery can broaden the indications and even help to deal with the radical nature of BCS. The majority of them are reductive mammoplasty, based on the various pedicles that can be transported for oncologic surgery. The most important factors within the choice of technique to be employed include degree of ptosis; differences in volume and shape already in the

Table 1 How to improve aesthetic results in conservative surgery

Immediate repair of oncologic deformities
A detailed preoperative planning means half of the surgical success
Whenever possible, include the medial pillar for partial reconstruction
Symmetrization is needed in most cases

Table 2 Recommendations to prevent complications and medical claims in oncoplastic surgery

Beware on disproportionate expectations from patients
Antibiotic prophylaxis is needed, as surgical procedures are more extensive
Perform sentinel lymph node biopsy and axillary emptying by different incision to preserve vascularization of the lateral flap
Avoid the rotation of muscle-cutaneous flaps in partial corrections, as they may be the reparative options in case of future relapses
Whenever possible, avoid reconstruction with prosthesis due to radiotherapy
Consider the possibility of performing mastectomy in patients with small, non-ptotic breasts
Anticipate possible problems with hypertrophic scar and keloid
Patients who are smokers, have diabetes and collagen diseases, or have undergone previous radiotherapy present additional risks for unsatisfactory aesthetic results and healing problems
Avoid extensive combined surgery types because the oncology patient needs to be assisted by means of adjuvant treatment as well

preoperative period; height of the inframammary fold; degree of liposubstitution of the breast; height, shape, and size of the NAC; and, mainly, size and location of the tumor.

Tumors located in the upper quadrants in small- and medium-volume breasts with a small ptosis degree can be operated with the "round block" technique. Tumors located in the lower quadrants can be operated with *Lejour* or *Pitanguy* technique or similar reduction mammoplasty techniques depending on the volume and degree of breast ptosis. Large breasts with severe ptosis and/or with tumors located in the upper quadrants can be operated with breast reductions based on the lower pedicles. However, more advanced glandular remodeling or even the use of autologous tissues or prostheses to avoid major deformities is sometimes necessary. Basically, mastering three techniques—upper pedicle, lower pedicle, and round block—allows the remodeling of more than 90% of cases of BCS.

Concerning mastectomies with preservation of the skin or NAC, immediate reconstruction and contralateral remodeling at the same time also represent an important technical advance and follow the same OP principles. The breasts can be reconstructed with expanders and prostheses or with autologous tissue.

Influence on Oncologic Treatment

The basilar study that established OP draws attention not only to its cosmetic benefits, but mainly to the surgical margins in this procedure. At the *Institute Curie*, Paris,

Clough et al. [1] studied 101 patients operated by means of OP techniques between 1985 and 1999. The average tumor-resected breast tissue weight was 222 g (four times as much as in a classic quadrantectomy). In 90 patients, the margins were free, and in 11 patients they were positive. The mean follow-up was 3.8 years and the local recurrence rate was 9.4%. Overall survival in this group of patients was 95.7% and metastasis-free survival was 82.8%. Aesthetic results were considered favorable in most cases. The study was able to bring important elements for discussion in the scientific community and proved the capacity of this type of surgery to allow more extensive breast resections.

Two other studies at the European Institute of Oncology in Milan have demonstrated the oncological safety of OP. The first one, a prospective study, compared the quadrantectomy margins with the OP margins and found a higher negative margin index in OP, thus confirming previous data in non-comparative studies. The second one, a retrospective cohort, sought to assess late oncologic outcomes. In the period between 1994 and 1999, 148 patients with tumors T1 to T3 underwent this type of surgery. The mean follow-up of these patients was 74 months and showed a lower-than-expected local recurrence rate in conventional CS. There was no local recurrence in patients in the carcinoma in situ and the pT1 carcinoma groups. Recent meta-analysis also showed lower rates of reoperation with OP compared to BCS.

There are well-established indications for OP in BCS. The main one is for patients with gigantism, where the results of mastectomy with preservation of the skin or the NAC are usually unsatisfactory and the OP can also favor radiotherapeutic planning.

Therefore, besides allowing for aesthetic improvement, OP can also reduce reoperations with damaged margins in the BCS. Breast reduction also improves local conditions for radiotherapy planning in bulky breasts, or it even allows BCS in patients with small breasts or in cases of tumors located in regions at risk for obtaining a satisfactory aesthetic result and in multifocal and multicentric tumors. This advance definitively modified the view that the concern with aesthetics could impair the oncological result, or vice- versa. And with that, the aesthetic results in both BCS and mastectomy have improved significantly in recent years.

Recommended Reading

1. Clough KB, et al. Oncoplastic techniques allow extensive resections for breast-conserving therapy of breast carcinomas. Ann Surg. 2003;237:26–34. *A pioneering study that gave origin to the current stage of oncoplastic surgery.*
2. 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. *A unicentric study comparing the results of classical quadrantectomy with those of oncoplastic surgery in terms of surgical margins. The superiority of oncoplastic surgery was demonstrated in terms of oncological radicality.*

3. Rietjens M, Urban CA, Rey PC, et al. Long-term oncological results of breast conservative treatment with oncoplastic surgery. Breast. 2007;16:387–95. *A retrospective cohort study that demonstrated a rate of local recurrence with oncoplastic surgery in DCIS and t1 lower than those found in conservative surgery.*
4. Santos G, Urban C, Edelweiss MI, Zucca-Matthes G, 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;22:2500–8. *A study comparing the results of conservative surgery with oncoplastic surgery in terms of aesthetic results and quality of life.*
5. Urban CA. New classification for oncoplastic procedures in surgical practice. Breast. 2008;17(4):321–2. *Classification of oncoplastic procedures for the surgical practice based on abilities.*