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## 18.1 Introduction

The concept of oncoplastic surgery is not so complicated. If the surgeon can manage three “basic” reduction mammoplasty techniques—techniques derived from the upper nipple and areola blood supply (superior pedicle) [1–3], techniques derived from the lower/posterior nipple and areola blood supply (inferior pedicle) [4–7], and techniques derived from the glandular nipple and areola blood supply (periareolar) [8, 9], it is possible to solve around 90 % of cases. In this chapter, the goal is to show possible solutions in special cases that seem initially much too complicated owing to anatomical variations, tumor locations, or patients’ wishes.

## 18.2 Oncoplastic Surgery with Implants

The indication for use of prostheses is always problematic in cases of partial immediate reconstruction after quadrantectomies as it is difficult to predict the aesthetic results after external radiotherapy. There is a higher risk of periprosthetic capsule formation, which can lead to malpositioning of the prosthesis with unsatisfactory aesthetic results. Nowadays, with the development of the new

techniques of external radiotherapy, with an optimal target dose calculation, the use of prostheses may be indicated in cases of small breasts with reduced thickness and with use of a wide base and low projection implant just to maintain the volume (Figs. 18.1 and 18.2).

## 18.3 Oncoplastic Surgery Plus Intraoperative Radiotherapy and Bilateral Breast Augmentation with Implants

This is a technique performed routinely in the European Institute of Oncology (IEO) for patients with small tumors and small breasts who wish for conservative surgery and also to increase the volume of the breast [10–12]. To avoid postoperative complications due to the traditional external radiotherapy, intraoperative radiotherapy can be done. All patients are treated with breast-conserving surgery (quadrantectomy). Electron beam intraoperative therapy is delivered by two mobile linear accelerators immediately after breast resection with a single dose of 21 Gy, which in radiobiology terms is similar to the 45-Gy of external radiotherapy. In young patients, only a boost in the tumor bed of 10 Gy is given and complementary external radiotherapy is provided after the surgery [13].

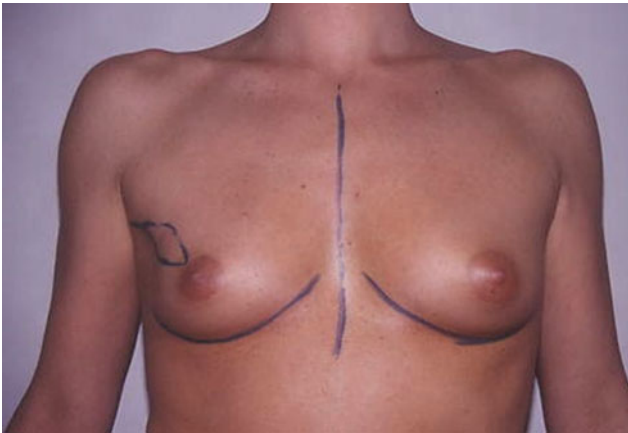
The quadrantectomy approach can be done through a periareolar incision. After tumor resection, the lateral glandular flaps are undermined to allow the insertion of two metallic disks (lead and aluminum) to protect the thoracic wall from diffusion of radiotherapy. Then, the mobile radiotherapy equipment is placed and the calculated dose is applied in the gland around the quadrantectomy. Then, the reconstructive step begins with insertion of the prosthesis below the pectoralis major muscle and with use of glandular flaps to cover the defect from quadrantectomy. The same implant is also used in the contralateral breast augmentation (Figs. 18.3, 18.4, 18.5 and 18.6).

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**Fig. 18.1** Preoperative image: upper outer quadrantectomy of the *right* breast



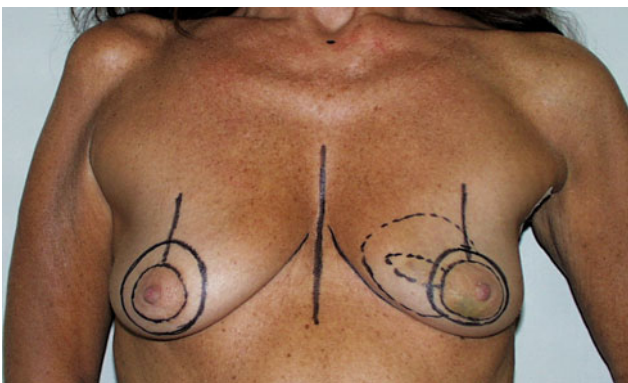
**Fig. 18.4** After excision of the tumor, the metallic disks (aluminum and lead) are placed to protect the thoracic wall before starting the electron beam intraoperative therapy



**Fig. 18.2** Postoperative results 6 months after subpectoral 90-cm<sup>3</sup> implant insertion and external radiotherapy



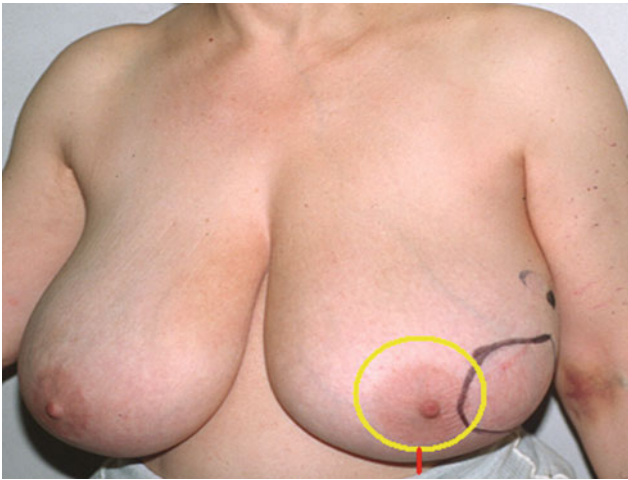
**Fig. 18.5** Intraoperative image: sterile collimator adjustment to deliver the intraoperative radiotherapy



**Fig. 18.3** Preoperative drawings: T1 tumor located between the internal quadrants of the *left* breast



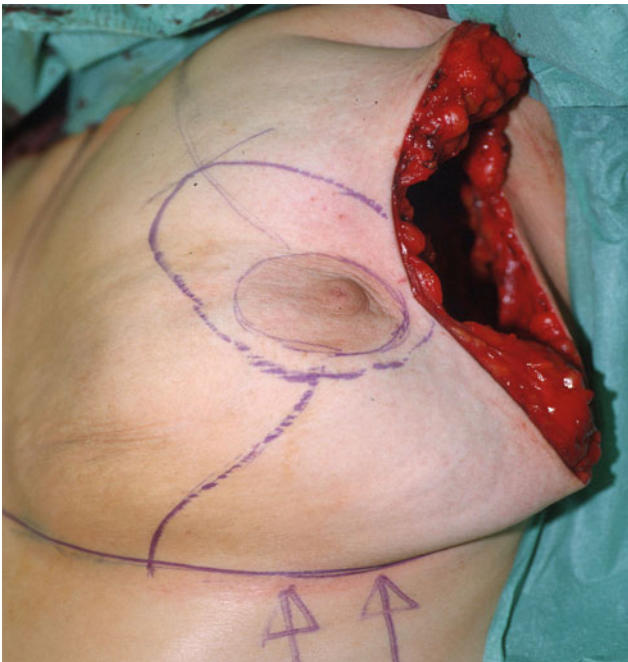
**Fig. 18.6** Postoperative image at 6 months: good cosmetic results without capsula contracture or radiodystrophy



**Fig. 18.7** Preoperative image: the *black line* is the tumor circumference



**Fig. 18.9** On-table view



**Fig. 18.8** Intraoperative image after the quadrantectomy (weight 420 g) and the drawing for Skoog and lower outer pedicle technique

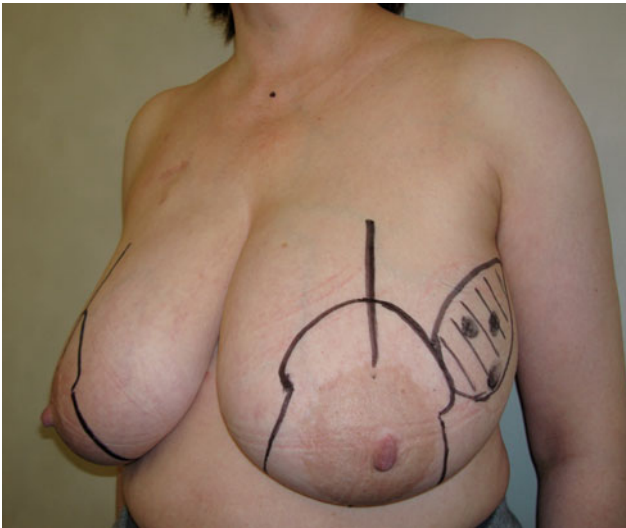


**Fig. 18.10** Cosmetic results 3 months after radiotherapy

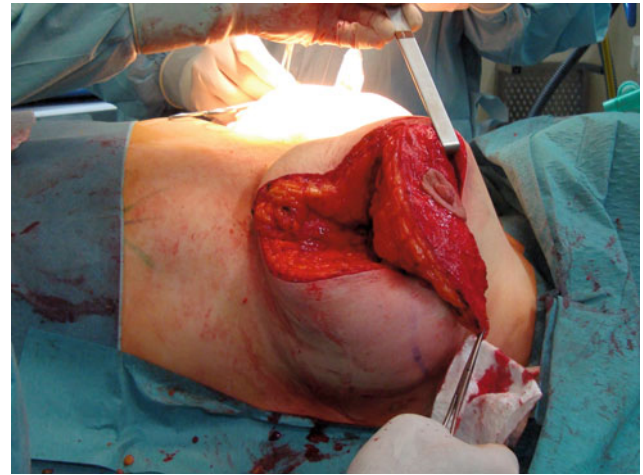
#### 18.4 Combined Mammoplasty Techniques

The oncoplastic surgeon with good experience with the main mammoplasty techniques can in special indications, such as breast size and tumor localization, combine two or more techniques to achieve a good cosmetic result. The basic requirement is good knowledge of breast blood supply in order to avoid skin and/or glandular necrosis.

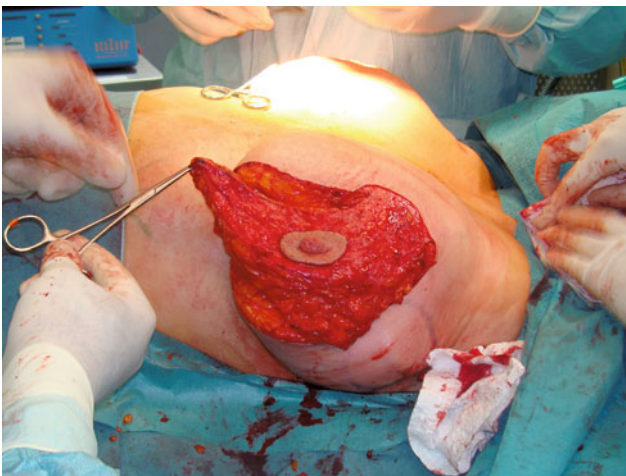
A useful technique in cases of large tumors in the upper outer quadrant and huge and ptotic breasts is the double pedicle technique. One pedicle is similar to that in Skoog technique, in order to pull up the nipple and areola complex with good blood supply [14, 15]. A second pedicle is a skin glandular pedicle, based on the vascular pedicles from the lateral border of the pectoralis major muscle and will be used to cover the glandular defect in the upper outer quadrant. This is a good solution in this situation with tumors that are very superficial and it where it is oncologically necessary to remove the skin over the lump, the only disadvantage being the large scars (Figs. 18.7, 18.8, 18.9, and 18.10).



**Fig. 18.11** Preoperative image: trifocal tumor in the upper outer quadrant. The drawing pattern is similar to that for the Lejour technique



**Fig. 18.13** Intraoperative image: the inferior triangle of glandular tissue normally removed with this technique will be rotated to cover the upper outer defect



**Fig. 18.12** Intraoperative image: after the quadrantectomy, a glandular flap is prepared on the basis of the upper inner quadrant

Another option for tumors located in the upper outer quadrant is a technique similar to Lejour's technique, but using the inferior triangle of glandular tissue rotated to cover the quadrantectomy defect (Figs. 18.11, 18.12, 18.13, 18.14, and 18.15). This technique can be used in large breasts with a medium degree of ptosis, the advantage being the shortness of the scars.

## 18.5 Fasciocutaneous Abdominal Flaps

It is always a challenge to achieve good cosmetic results with conservative surgery for small tumors in small breasts. In the case of thin patients with a small breast without ptosis

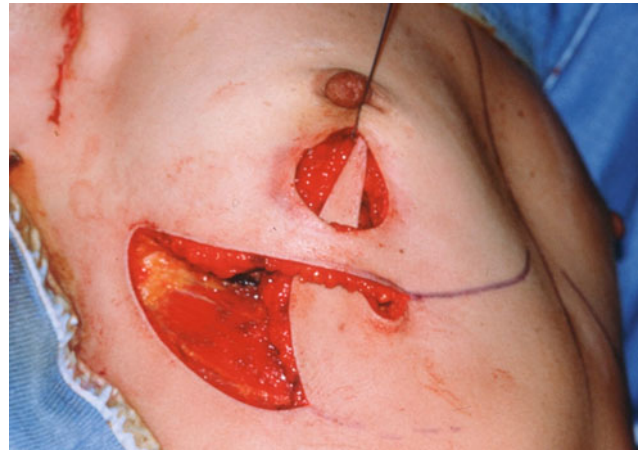


**Fig. 18.14** Intraoperative image showing the final reshaping with only periareolar and vertical scars

and small tumors located in the inferior quadrant, a fasciocutaneous flap harvest just above the inframammary fold and rotation to cover the defect can be indicated [16, 17]. The flap should be taken just above the inframammary fold and the pedicle oriented in the medial portion to preserve the perforator vessels coming through the upper part of the rectus abdominis muscle. The flap orientations follow the inframammary fold in order to maintain the scar exactly at



**Fig. 18.15** Postoperative image after 6 months



**Fig. 18.17** Intraoperative image: flap rotation and the abdominal skin flap should be undermined to fix the final scar at the level of the inframammary fold



**Fig. 18.16** Preoperative drawings: skin excision for lower tumor resection and flap drawing in order to put the final scar in the inframammary fold



**Fig. 18.18** Postoperative image after 1 month

this level so it is less visible (Figs. 18.16, 18.17, and 18.18) [18].

Others solutions can be used depending on the defect localization and the excess of skin in the inferior portion, lateral portion, or axillary portion (Figs. 18.19, 18.20, and 18.21).

## 18.6 Reshaping with Nipple and Areola Grafting

Some “special indications” of large conservative surgery can be taken into consideration following the patient’s request. In the case of large tumors or multifocal tumors in the superior quadrants, a large quadrantectomy with skin

excision can be indicated. In this case, a complete transposition of the lower pole of the breast in order to have a good breast shape is possible, but the nipple and areola complex should be transposed as a skin graft (Figs. 18.22, 18.23, 18.24, and 18.25) [19].

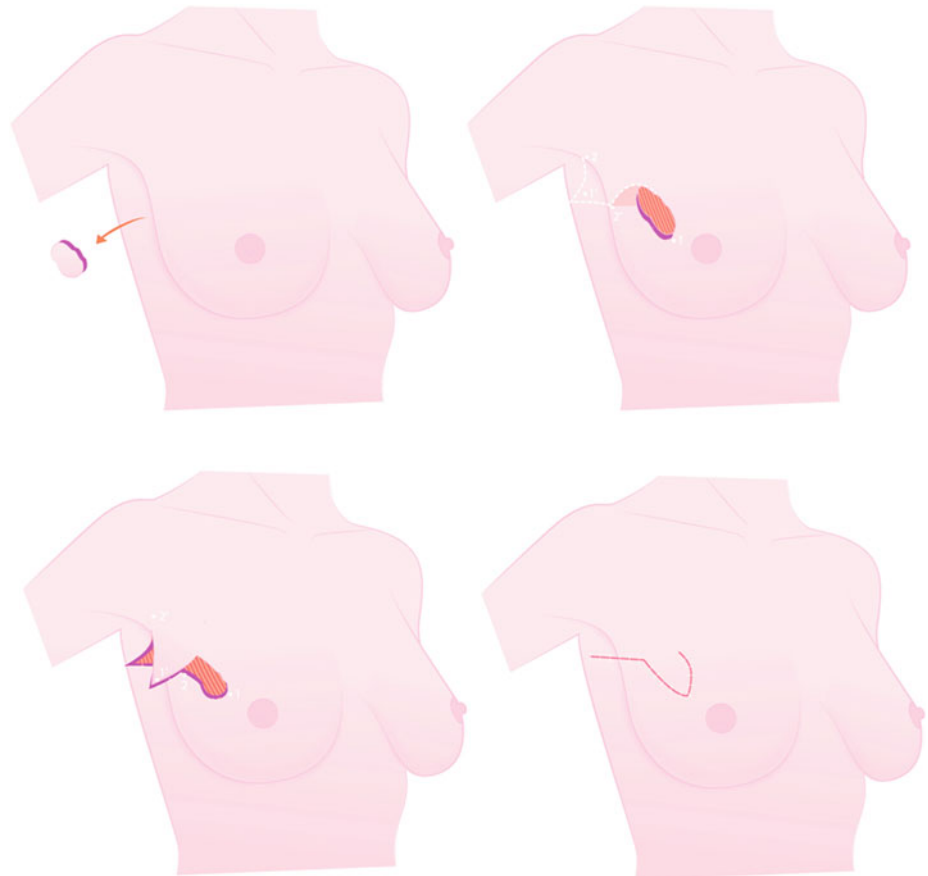
## 18.7 Musculocutaneous Flaps

An immediate reconstruction with musculocutaneous flaps may cause some difficulties, mainly due to the need for postoperative radiotherapy. Either a moderate or a major radiodystrophy could negatively affect the final aesthetic result.

**Fig. 18.19** Other options for lateral rotation skin flaps



**Fig. 18.20** Options for axillary skin rotation flaps





**Fig. 18.21** Options for inferolateral fasciocutaneous flaps



**Fig. 18.22** Preoperative planning: bifocal tumor in the upper pole of the breast very close to the skin



**Fig. 18.23** Intraoperative view after the large skin and glandular resection

## 18.7.1 Latissimus Dorsi Flap

### 18.7.1.1 Indications

The latissimus dorsi flap technique was first proposed by Olivari [20] for breast reconstruction, and today it is possible to use it in selected cases for immediate partial

reconstruction after quadrantectomy. The best indication for this technique is reconstruction of external quadrants or even repair of the central quadrant [21–23].



**Fig. 18.24** Intraoperative view after glandular reshaping and nipple and areola transposition as a skin graft



**Fig. 18.27** Intraoperative image after the quadrantectomy and axillary dissection



**Fig. 18.25** Final results after 6 months



**Fig. 18.28** Rotation of the latissimus dorsi musculoadipose flap



**Fig. 18.26** Preoperative image: tumor located in the upper outer quadrant. Patient with small breast and who refused mastectomy

### 18.7.1.2 Technique

The traditional technique is described in more detail in the specific chapter about it. In this chapter we will focus on the musculoadipose flap of the latissimus dorsi muscle (with no dorsal scar) for immediate breast repair after





**Fig. 18.29** The flap is used to cover the quadrantectomy defect



**Fig. 18.30** The final results on the table

quadrantectomy. This technique can be used in cases of superoexternal quadrantectomy, with no skin removal, and in small breasts without ptosis.

After quadrantectomy and biopsy of the sentinel lymph node (or axillary lymphadenectomy), it is possible to prepare a musculoadipose flap of latissimus dorsi muscle through the same incision. This flap is placed in the anterior thoracic region to repair the defect from quadrantectomy (Figs. 18.26, 18.27, 18.28, 18.29, and 18.30).

### 18.7.2 Rectus Abdominis Flap

From our experience, we do not indicate immediate partial reconstruction after quadrantectomy with a musculocutaneous flap from the rectus abdominis muscle. This is a

major surgical procedure for a partial repair and yet there is the risk of an incorrect aesthetic result after radiotherapy applied to the flap. There is a report of partial breast reconstruction with mini superficial inferior epigastric artery and mini deep inferior epigastric perforator flaps with satisfactory results [24].

## 18.8 Other Flaps

Several other methods related to oncoplasty have been reported for partial breast reconstruction, for example, transverse gracilis flap [25], omental flap [26, 27], and a combination of flaps [28]. However, they are rarely performed and are presently less popular.

## 18.9 Conclusion

In general, oncoplastic surgery can be performed by mammoplasty techniques. Knowledge and understanding of vascular supply of breast parenchyma and the nipple–areola complex is a very important key to success. When a simple mammoplasty technique cannot be used, there are other options that surgeons and patients can discuss. Prosthesis reconstruction can be performed with a low capsular contraction rate when the proper intraoperative radiotherapy protocol is used. Other fasciocutaneous and myocutaneous flaps can be done with promising results, and surgeon should keep in mind the oncoplastic principle to achieve the best oncologic and aesthetic benefit.

## References

1. Lejour M (1993) Vertical mammoplasty. *Plast Reconstr Surg* 92:985–986
2. Lejour M (1999) Vertical mammoplasty: update and appraisal of late results. *Plast Reconstr Surg* 104:771–781; discussion 782–774
3. Pitanguy I (1967) Surgical treatment of breast hypertrophy. *Br J Plast Surg* 20:78–85
4. Ribeiro L, Accorsi A Jr, Buss A, Marcal-Pessoa M (2002) Creation and evolution of 30 years of the inferior pedicle in reduction mammoplasties. *Plast Reconstr Surg* 110:960–970
5. Ribeiro L (1975) A new technique for reduction mammoplasty. *Plast Reconstr Surg* 55:330–334
6. Robbins TH (1984) Inferior pedicle breast reduction technique. *Plast Reconstr Surg* 73:325
7. Robbins TH (1977) A reduction mammoplasty with the areola-nipple based on an inferior dermal pedicle. *Plast Reconstr Surg* 59:64–67
8. Benelli L (1990) A new periareolar mammoplasty: the “round block” technique. *Aesthet Plast Surg* 14:93–100
9. Goes JC (1996) Periareolar mammoplasty: double skin technique with application of polyglactine or mixed mesh. *Plast Reconstr Surg* 97:959–968

10. Rietjens M, De Lorenzi F, Veronesi P et al (2006) Breast conservative treatment in association with implant augmentation and intraoperative radiotherapy. *J Plast Reconstr Aesthet Surg* 59:532–535
11. Orecchia R, Ciocca M, Lazzari R et al (2003) Intraoperative radiation therapy with electrons (ELIOT) in early-stage breast cancer. *Breast* 12:483–490
12. Veronesi U, Orecchia R, Luini A et al (2010) Intraoperative radiotherapy during breast conserving surgery: a study on 1,822 cases treated with electrons. *Breast Cancer Res Treat* 124:141–151
13. Aristei C, Amichetti M, Ciocca M et al (2008) Radiotherapy in Italy after conservative treatment of early breast cancer. A survey by the Italian Society of Radiation Oncology (AIRO). *Tumori* 94:333–341
14. Botta SA, Rifai R (1991) Personal refinements in the single pedicle Skoog technique for reduction mammoplasty. *Aesthetic Plast Surg* 15:257–264
15. Skoog T (1963) A technique of breast reduction; transposition of the nipple on a cutaneous vascular pedicle. *Acta Chir Scand* 126:453–465
16. Holmstrom H (1979) The free abdominoplasty flap and its use in breast reconstruction. An experimental study and clinical case report. *Scand J Plast Reconstr Surg* 13:423–427
17. Holmstrom H, Lossing C (1986) The lateral thoracodorsal flap in breast reconstruction. *Plast Reconstr Surg* 77:933–943
18. Bohmert H (1980) Experience in breast reconstruction with thoraco-epigastric and advancement flaps. *Acta Chir Belg* 79:105–110
19. Spear SL, Hoffman S (1998) Relocation of the displaced nipple-areola by reciprocal skin grafts. *Plast Reconstr Surg* 101:1355–1358
20. Olivari N (1979) Use of thirty latissimus dorsi flaps. *Plast Reconstr Surg* 64:654–661
21. De Lorenzi F, Rietjens M, Soresina M et al (2010) Immediate breast reconstruction in the elderly: can it be considered an integral step of breast cancer treatment? The experience of the European Institute of Oncology, Milan. *J Plast Reconstr Aesthet Surg* 63:511–515
22. Munhoz AM, Montag E, Fels KW et al (2005) Outcome analysis of breast-conservation surgery and immediate latissimus dorsi flap reconstruction in patients with T1 to T2 breast cancer. *Plast Reconstr Surg* 116:741–752
23. Bobin JY, Delay E, Rivoire M (1994) Reconstruction of severe breast deformities following conservative cancer surgery and radiation therapy with a latissimus dorsi myocutaneous flap. *Surg Technol Int* 3:523–528
24. Spiegel AJ, Eldor L (2010) Partial breast reconstruction with mini superficial inferior epigastric artery and mini deep inferior epigastric perforator flaps. *Ann Plast Surg* 65:147–154
25. Schoeller T, Huemer GM, Wechselberger G (2008) The transverse musculocutaneous gracilis flap for breast reconstruction: guidelines for flap and patient selection. *Plast Reconstr Surg* 122:29–38
26. Zaha H, Sunagawa H, Kawakami K et al (2010) Partial breast reconstruction for an inferomedial breast carcinoma using an omental flap. *World J Surg* 34:1782–1787
27. Cothier-Savey I, Tamtawi B, Dohnt F et al (2001) Immediate breast reconstruction using a laparoscopically harvested omental flap. *Plast Reconstr Surg* 107:1156–1163; discussion 1164–1155
28. Lee J, Bae Y, Audretsch W (2012) Combination of two local flaps for large defects after breast conserving surgery. *Breast* 21(2):194–198