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Review

Plastic surgical management of the contralateral breast in post-mastectomy breast reconstruction

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ABSTRACT

Breast reconstruction following mastectomy can be reliably undertaken using many different techniques. Although excellent cosmetic results can be achieved without contralateral balancing surgery, many unilateral breast reconstructions require a balancing procedure on the contralateral breast in order to achieve symmetry; the ultimate goal in breast reconstruction.

This article attempts to summarise the existing literature on the plastic surgical management of the contralateral breast. It also outlines the multifactorial and complex issues involved in the planning and undertaking of such surgery with illustrative examples. The implications for future oncological management and radiological surveillance following the procedure are also discussed in brief.

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1. Introduction

Plastic surgical treatment of the opposite breast is an important aspect of post mastectomy breast reconstruction. It is however, not well addressed in the literature. It is only in the last decade that it has become an integral part of the care of breast cancer patients. This article provides an overview on this subject for oncoplastic breast surgeons, plastic surgeons who undertake breast reconstruction, general and plastic surgical residents and related healthcare professionals involved in breast cancer care.

This review is based on an English language literature search of PubMed, Embase, Cinahal, Cochrane Library and Scopus databases with secondary references obtained from key articles and reference books. It includes pertinent papers published between 2000 and 2012 and any landmark papers prior to this period.

2. The rationale for contralateral symmetry surgery

The ultimate aim of post mastectomy breast reconstruction is the achievement of symmetry with the opposite breast. While this objective can be achieved without contralateral balancing surgery (Fig. 1), sometimes, it is desirable to alter the opposite normal breast in order to optimise symmetry.

The decision to operate on the contralateral breast for symmetry is complex and multifactorial. The factors influencing contralateral symmetrisation of the unaffected breast can be divided into four broad categories; the optimisation of symmetry, patient satisfaction, technical considerations and finally, the financial and political implications [Table 1]. These factors are discussed below.

2.1. Optimisation of symmetry

There are a variety of reasons why patients choose to have breast reconstruction after mastectomy and most of them have symmetry as their basis, hence, the overall aim of reconstructive breast surgery is "To make women look normal and feel comfortable in their clothing without having to wear an external

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Fig. 1. This 58-year old lady underwent delayed free DIEP flap reconstruction of the left breast without any contralateral balancing procedures.

prosthesis”.¹ Achievement of the best possible cosmetic result has been facilitated by the changes over the last quarter of a century from delayed to immediate breast reconstruction,^{2–5} from radical to skin-sparing mastectomies^{6–8} and from prosthetic to autologous tissue reconstruction.^{9–12} However, despite these advances, the contralateral breast may be difficult to match (with certain types of reconstructions) or its shape and size may not be desirable as a target. Hence many unilateral breast reconstructions need a contralateral balancing procedure.^{9,13,14}

2.2. Patient satisfaction and motivation

Post-mastectomy breast reconstruction allows a patient to feel comfortable in her clothing or undressed if symmetry is good.^{9,10} Given the choice many patients prefer to leave their unaffected breast “Untouched by the surgeon’s scalpel”.¹⁶ However, some patients have an unattractive contralateral breast and adjustment of its shape and size is welcome as matching it would produce two unattractive breasts. The patient’s desires or concept of the ideal breast is hence an important consideration in symmetrisation surgery.

Spear simplifies this situation by dividing the contralateral breast surgery in patients undergoing unilateral breast

reconstruction into two.¹⁷ First are those patients in whom the contralateral surgery improves the situation that the patient might have requested plastic surgery for anyway even without the diagnosis of breast cancer. These include patients with symptomatic macromastia, significant breast hypoplasia, atrophic and ptotic breasts (Fig. 2). In the second group, contralateral balancing surgery is undertaken to correct the deficiencies of the reconstruction where it is more practical to alter the normal breast than the reconstructed one. Overall, studies suggest that patients are satisfied with breast reconstruction whatever the technique used, however, their satisfaction scores are influenced by breast symmetry, size, shape and scars.¹⁸

2.3. Technical considerations

Conceptually in order to match the reconstructed breast, the opposite breast may be reduced (reduction mammoplasty), enlarged (augmentation mammoplasty), lifted (mastopexy), or both lifted and enlarged (augmentation/mastopexy). Alternatively the unaffected contralateral breast may be removed and reconstructed de novo (prophylactic mastectomy with reconstruction).^{9,10}

The change from delayed to immediate timing of reconstruction and the use of autologous reconstructions reduces the need for contralateral symmetry procedures.⁹ This is especially true when a skin sparing mastectomy (SSM) is coupled with the immediate autologous reconstructions. In contrast implant-based reconstructions are less natural and often require balancing surgery on the opposite breast.^{19–22} The reasons for this include the rounded upper pole of the implant-reconstructed breast, which often needs augmentation of the opposite breast for symmetry. Additionally implant reconstructed breasts do not change in size or shape as the patients’ weight fluctuates or as the patient gets older. Other factors include peri-implant capsular contracture that may distort the breast shape and therefore further contribute to

Table 1
Factors determining the need for a contralateral symmetry procedure.

• Patient’s pre-mastectomy breast size • Patient’s post-reconstruction desires (regarding size and shape) and their concept of the ideal breast • Type of mastectomy: non skin-sparing >> skin-sparing (relative risk 2×) • Type of reconstruction: prosthesis >> autologous • Timing of reconstruction: delayed >> immediate (relative risk 3×) • Need for any adjuvant therapy • Surgeon’s experience and preference • Reconstructive options available • Reimbursement considerations
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PRE-OPERATIVE



POST-OPERATIVE



Fig. 2. A 39-year old patient with a grade 2 ptotic right breast and previous left sided breast cancer. She underwent a left delayed extended muscle-sparing hemi-free TRAM flap reconstruction with right breast Lejour vertical scar balancing mastopexy. A vertical scar mastopexy improves upper pole fullness and central projection while decreasing the risk of recurrent lower pole ptosis by hitching up the lower parenchyma to the chest wall and the reshaping effect of approximation of the pillar. A true Lejour coning by creating pillars and suturing them together gives the best mastopexy (in our experience). The aesthetic result is very good encompassing all the desirable features including a good aesthetic outcome in reductions from all sizes and less scarring than standard breast reduction techniques⁶⁴ and high levels of patient satisfaction.⁶⁵

asymmetry. Therefore in the longer term a symmetry procedure is more likely to be required with implant reconstructions.

Also to be considered here are the prophylactic/risk-reducing mastectomy patients. The rate of contralateral prophylactic mastectomies is increasing^{24,25} especially in high risk patients such as those with a strong family history or known BRCA1 or BRCA2 gene mutation. These patients tend to be young and are often very concerned about their risk of cancer but through a prophylactic mastectomy see an increase in their 5-year survival.²⁶ In order to best achieve near perfect symmetry, both breasts should be reconstructed with the same technique.

2.4. Financial and political implications

The availability and reimbursement for symmetry surgery plays an influential role in access to reconstructive surgery as some funding agencies consider balancing surgery as purely cosmetic and therefore refuse to fund such surgery. In the USA the 1998 Women's Health and Cancer Right Act,²⁷ made it compulsory for Health Insurance companies to cover surgery on the opposite breast to achieve symmetry (US Congress, 1998). In the UK, while contralateral surgery is available on the National Health Service (NHS), waiting list pressures coupled with limited resources impact upon service provision, especially in cases of immediate post mastectomy breast reconstruction. Financially struggling hospitals have incentives not to offer simultaneous contralateral balancing surgery at the same time as the reconstruction as the procedure takes longer and may not be reimbursed by the Primary Care Trusts (PCTs) unless performed at a different stage.

Interestingly, in healthcare systems in which insurance reimbursement is required for most procedures the percentage of implant-based post-mastectomy reconstructions is as high as 75%.²⁸ In contrast, in a publically funded healthcare system implant reconstructions constitute a mere 37%.²⁹

3. Timing of contralateral surgery with respect to the mastectomy and reconstruction

Although the pros and cons of immediate versus delayed reconstruction are well documented,⁵ the ideal time for performing a balancing procedure on the contralateral breast remains controversial.⁹ Several factors affect the timing of contralateral balancing surgery. Important patient factors include the fitness for "Prolonged" surgery, the individual's surgical risks, and the added burden of the procedure on the length and morbidity of the reconstruction. Often practical considerations such as availability of operating time, presence or absence of suitable surgical assistants and waiting list pressures take priority over the surgeon's and patient's preferences.

From the patient's perspective, an obvious advantage of performing the symmetry procedure concomitant with the reconstruction is that another operation and general anaesthetic is avoided. Al Ghazal³⁰ et al. found patients who had immediate reconstruction recalled less distress and had better psychosocial well being than those who had delayed reconstruction. Theoretically, extrapolating from this, the same consensus would be applicable to management of the contralateral breast but there are no studies documenting this.

Simultaneous contralateral balancing reductions³¹ and augmentations³² have been shown to only minimally increase the operative time, yield greater patient satisfaction and do not increase the complication rate. The aesthetic results are said to be better with this approach "Because the corrected opposite breast becomes the model for the breast reconstruction rather than the corollary"⁶ (Fig. 3). Additionally the option to initially reshape and resize the opposite breast can simplify the reconstruction and minimise asymmetry.⁹

Opponents of immediate contralateral balancing surgery contend that simultaneous surgery unnecessarily prolongs and

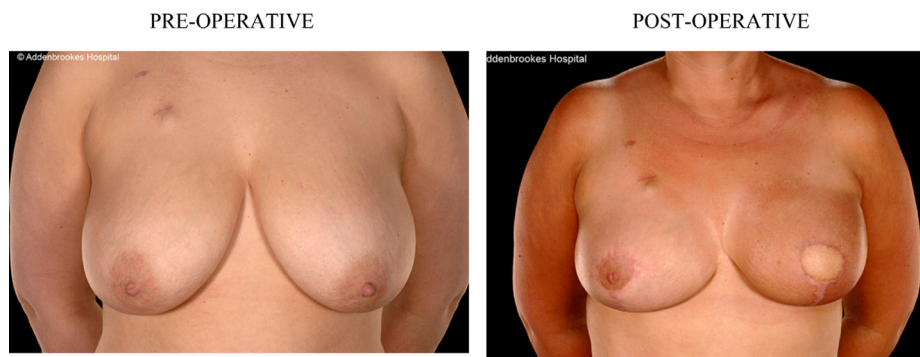


Fig. 3. 39-year old patient with left-sided breast cancer who received neoadjuvant chemotherapy followed by a left Lejour pattern skin-sparing mastectomy with immediate DIEP flap reconstruction and right-sided balancing Lejour breast reduction. The patient required postoperative radiotherapy. She declined nipple reconstruction. Please note the radiation reaction on the left reconstructed breast. When used for contralateral balancing surgery, vertical mammoplasty gives good symmetrical results especially when the same skin resection pattern is also employed for the mastectomy.^{6,7} This is especially applicable to patients with large, and/or significantly ptotic breasts undergoing immediate autogenous tissue reconstruction. In this situation it is important to be conservative with the skin resection, and avoid the hitching sutures so that the mound is not too high (compared to the reconstructed breast). The breast shape is now dependent on the approximation of the pillars and, to a lesser extent, the skin envelope. The conservative skin excision and glandular resection in terms of width also minimises the projection, a desirable characteristic in matching the reconstruction as most reconstructions tend to be deficient in the antero-posterior projection.

increases the complexity of the reconstructive operation and the general anaesthesia, increases the blood loss and thus potentially increasing the morbidity. Additionally significant fat necrosis or partial flap loss may necessitate or impose a change of plan for both the reconstructed and contralateral breast. There are several studies which contradict this claim.^{31,32}

Additionally, both the reconstructed breast and the normal altered breast will change postoperatively (sometimes unpredictably), thus making it difficult to achieve symmetry with a “Moving target”. Postoperatively, as the swelling subsides and the reconstruction “settles” the new breast contracts slightly (becoming smaller) and its position often changes (drops). Often, most breast reconstructions require at least one revision²¹ therefore undertaking symmetry surgery may not necessarily reduce the number of operations required to complete the reconstruction. However, any further adjustment procedures that may be required tend to be minimal as advocated by Petit et al.¹⁵

If contralateral surgery is not undertaken simultaneously we prefer to delay it until adjuvant chemotherapy or radiotherapy is completed. It has been demonstrated that immediate breast reconstruction followed by irradiation results in an increased rate in failure of tissue reconstruction, infections and capsular contractures in implant based reconstructions.^{33–35} The reconstructed usually becomes smaller even with tissue flaps.^{36–38}

4. Oncological considerations

Contralateral breast surgery provides an opportunity for examination of the unaffected contralateral breast under anaesthesia aiding the diagnosis of occult carcinomas.^{15,23} This is important because the contralateral breast, in patients with unilateral breast cancer, is at an increased risk of developing breast cancer. The risk varies with the type of cancer and family history. For example, the risk of a invasive ductal carcinoma (IDC) in the contralateral breast is twice that of normal women (0.7% per year)^{39–41} and for lobular carcinoma in situ (LCIS) or with a strong family history of premenopausal cancer it is even higher.^{42,43} Therefore, the main oncological concern following contralateral balancing procedure is the monitoring of the contralateral breast for cancer.

Reconstructive and balancing surgical procedures inevitably induce physical changes in the breast leading to architectural alterations that may affect the future oncological surveillance of the

opposite breast.⁴⁴ The surveillance concerns vary depending on the procedure performed.

Encouragingly mammographic/radiological changes after reduction mammoplasty are predictable and can usually be radiographically differentiated from those associated with cancer.⁴⁴ In addition, a balancing reduction mammoplasty provides an opportunity to screen the excised tissue for occult cancers.⁴⁵ The incidence of occult carcinoma in the excised breast tissue has been reported to be from <1% to 3–5% in different series.¹⁵

No significant association has been found between the presence of breast implants with an increased risk of breast cancer.^{46,47} However, there is contradicting evidence regarding the impact of breast implants on the detection of breast cancer. Some have found them to reduce the sensitivity of breast examination and mammography potentially delaying a diagnosis of breast cancer.^{48,49} Others have shown these patients are more likely to present with a palpable mass and have a similar prognosis to the non-augmented population.^{46,48,50} In the augmented breast, the fibrous capsule and capsular contractures are prone to calcifications in the long term. These mineralised deposits potentially confound mammographic breast cancer surveillance already made difficult by the obscuring effects of silicone breast implants.⁵¹ These changes can also mimic changes seen in malignancies.⁴⁴ It has been recommended that saline implants are easier than silicone implants to image because they cause less capsular contracture.^{52,53} Better films are generally obtained when the implant is in the submuscular position rather than subglandular^{54,55} therefore this position is preferable in contralateral balancing surgery for cancer reconstruction because it interferes less with the mammography i.e. it minimises the obscuring effect of the implant on native breast tissue.

Ultrasound is a useful adjunct to mammography in evaluating palpable breast abnormalities in the reconstructed/augmented breast, especially in symptomatic patient's.^{56,57} It provides visualisation of the breast tissue–prosthesis interface, and can distinguishing breast parenchymal lesions from palpable irregularities of the implant.^{58,59} Magnetic resonance imaging has also been shown to be effective in screening breasts after implant and tissue reconstruction, although the cost appears to be a constraint.⁶⁰ A baseline mammogram or MRI is recommended 6–12 months post-operatively.⁷ In cases of suspicious imaging abnormalities stereotactic fine-needle aspiration biopsy has been shown to be reliable for evaluation and confirmation of such a lesion.^{61–63}

5. Conclusions

Restoration of breast aesthetics following mastectomy entails both recreation of the affected breast and achieving breast symmetry. The contralateral breast is the most decisive factor in reconstructing a breast, because it is the symmetry between the two that is the foremost goal. The increased understanding of the pathological, clinical; radiological and oncological progression of the post- surgical changes on the contralateral breast has made the plastic surgical management of the contralateral breast oncologically safe.

The timing of the symmetry procedure with respect to the reconstruction remains controversial and is the subject of another publication. The technique implemented, in order to reconstruct and balance the breasts, relies on careful consideration of the technical feasibility, acceptable risks and obtainable aesthetic result of each method in conjunction with careful management of the patients' ideas, concerns and expectations. A well balanced symmetrical outcome will invariably result in optimum patient satisfaction, the ultimate goal.

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Rizki H.: Involved in conducting the literature review and writing the paper.

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Conflict of interest

There are no conflicts of interest by any of the authors involved in producing this paper

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