

A retrospective investigation of women's experience with breast reconstruction after mastectomy

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Abstract

Purpose A diagnosis of breast cancer is often accompanied by the fear of loss of previous body image and attractiveness. Hence, many patients opt for reconstructive surgery. This study evaluated the effects of different types of reconstructive surgery after mastectomy on the functional and psychological adjustment of patients.

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Methods In a cohort study, patients, who had breast reconstruction after mastectomy by means of four different allogenic or autologues techniques between 1999–2006 were retrospectively interviewed in person or by telephone. The questions addressed complication rates, physical complaints, functional impairments, body image outcomes, sexuality and patient satisfaction.

Results Of 139 patients, 89 (64.7 %) completed the survey. 32 (35.9 %) patients experienced one or more postoperative complications like seroma, hematoma, infections or necrosis. 16 (20 %) and 13 (16 %) patients reported strong and moderate adverse effects on sexuality, respectively. 62 (70 %) patients indicated that they were actively included in the decision making process. Patient ratings of good or bad medical advice were associated with complication rates ($p = 0.008$). Patients, who evaluated their first preoperative counseling positively, reported higher consent rates when a re-reconstruction became necessary ($p \leq 0.001$). Satisfaction with the functional outcome after reconstruction and satisfaction with the cosmetic result was highly correlated ($p < 0.001$).

Conclusions A significant association of patient satisfaction with postoperative complications and the decision for a re-reconstruction was demonstrated. Furthermore, our results emphasize the importance of detailed preoperative counseling for women's adjustment to reconstructive surgery.

Keywords Breast cancer · Breast reconstruction methods · Latissimus dorsi-flap · TRAM · Prosthesis

Introduction

The long-term outcome of breast cancer is favorable with an over two-thirds five-year survival rate [1]. In about half

of all patients diagnosed with breast cancer, breast conserving surgery is possible. Although the cases of mastectomy are declining [2], these women also fear the destruction of their physical integrity [3]. The diagnosis of breast cancer confronts women of all ages with anxieties about their appearance, their attractiveness, their sexuality and their self-esteem [3–5]. Because of these reasons, reconstructive breast surgery became more and more important to women who underwent a partial or full mastectomy. Breast reconstruction can be carried out simultaneously at primary surgery or at a later stage (secondary) with various methods available [6]. Women, who opt for reconstructive surgery, expect the utmost safety, such that the plastic surgery may not adversely affect their prognosis nor the good cosmetic outcome. Consequently, an important step to recovery is the patient satisfaction with their new bodily appearance.

This retrospective study compares patients post mastectomy who underwent different types of breast reconstructive techniques [LAT (musculus latissimus dorsi flap) with or without prosthesis, TRAM (Transverse Rectus Abdominis Myocutaneous) flap or sole use of a sub-pectoral prosthesis set] in terms of their complication rates, patient satisfaction with the reconstructed breast, body image, sexuality and attractiveness.

Materials and methods

Breast cancer patient outcomes after plastic breast reconstruction were evaluated. The sample was retrieved from the analysis of medical charts or electronic tumor registry data of patients treated between 1999 and 2006 with reconstructive surgery at the Department of Gynecology and Obstetrics of the Ludwig-Maximilians-University-Campus Grosshadern. 139 of a total of 149 (10 patients had already died) were available for this survey, which was part of the postoperative quality assurance. Data collection was based on medical and surgical reports including breast reconstruction methods, primary histopathological tumor data and information of breast cancer treatment apart from breast surgery. Patients were interviewed by telephone or in person. For the assessment of the patients' experience, two questionnaires were used: an author developed scale (1) and the Body Image Scale [7], a validated questionnaire (2).

- (1) The author-developed questionnaire addressed decision making, stress, pain, advice, cosmetic result and associated feelings, behavioral and cognitive factors on 11-point Likert scales ranging from 0 to 10. We used a self-constructed questionnaire since no validated scale that specifically addressed the aspects of

Table 1 Advantages and disadvantages of breast reconstruction with single prosthesis [2, 8]

Advantages	Disadvantages
Short duration of surgery	Multiple interventions needed Additional operations: surgery on the contra-lateral breast, dislocation of prosthesis, capsular contracture, leakage
Minor tissue trauma resulting in lower complication rates (seroma, hematoma, infection, necrosis, hernia)	Only recommended for small breast volume and little or no ptosis of the breast Possible radiation-induced complications (e.g., scarred distortions)
More rapid recovery	Skin ulceration (very thin soft tissue cover)

satisfaction and quality of life following reconstructive surgery, which we wanted to investigate.

- (2) The Body Image Scale [7] probes the body image perceptions of breast cancer patients. The questionnaire aims to measure the feeling of reduced attractiveness or femininity due to the illness, difficulties seeing oneself naked and the dissatisfaction with the outer appearance or the scar. Items are answered on a 4-point Likert scale (range 0–3). The total score is the sum across items and ranges between 0 and 30, with higher scores representing more impairment in body image.

Patients who underwent purely prophylactic or reconstructive procedures without underlying breast cancer were excluded from the survey. Since some of the primary breast cancer operations had not been performed at our hospital, not all the tumor data were available.

Reconstructive methods

The following breast reconstructive methods were performed at the time of this evaluation at the Department of Gynecology and Obstetrics at the Ludwig-Maximilians-University Hospital-Campus Grosshadern: sub- or pre-pectoral replacement of prostheses with or without prior use of expanders (Table 1; [2]), LAT-with or without additional prostheses (Table 2; [2, 8]), TRAM (Table 3; [2, 8]).

The individual motives for choosing a specified reconstructive procedure were collected, and the degree of satisfaction with the reconstructed breast was evaluated. Form, size, symmetry, consistency and possible scars were queried alongside mental aspects.

Statistical methods

Apart from purely descriptive calculations, nonparametric and parametric analyses were used, depending on the scale

Table 2 Advantages and disadvantages after reconstruction with LAT [2, 8]

Advantages	Disadvantages
Good modeling	Back scar
Enough subcutaneous fat for reconstruction	Possible partial or complete necrosis with poor cosmetic results
Suitability for voluminous breast (possibly in combination with a prosthesis)	Possible shrinkage of the skin flap after irradiation resulting in asymmetry and possibly follow-up corrective operations
Low complication rate post-radiation therapy [, or intent to?]	Insertion of the skin flap from other parts of the body: different skin coloring and texturing can lead to a “patch” phenomenon
Applicable in recurrent situations, when large defect coverage is needed	Long duration of surgery
Applicable after failure with prosthesis reconstruction	Frequent complications: Problems with adduction of the arm
Good long-term results	

Table 3 Advantages and disadvantages after reconstruction with TRAM [2, 8]

Advantages	Disadvantages
Suitable for voluminous breasts	Higher incidence of necrosis
Excellent long-term results	High rate of complications in extremely obese patients, smokers, diabetics,...
Natural look, feel and aging	Good physical condition necessary
	Partial movement restrictions
	Herniation possible
	Long waiting time
	Long postoperative convalescence

level and the distribution pattern of the collected data. To examine the relationship between binary variables, the Chi-square test and, in case of more than two categories, the Cramer-V test were conducted. If the expected frequency was <5 , the Fisher's exact test was also performed. Statistical significance was accepted at a p value of ≤ 0.05 (two-tailed). SPSS 16.0 was used for statistical analysis.

Results

Patient characteristics

Breast cancer patients' satisfaction after plastic reconstruction of the breast was evaluated post a median follow-up period of 5 years (mean 4.77 years, standard deviation 1.83 years, range 1–8 years). The average age at diagnosis

was 47.4 years (range 26–67 years), and the average age at the time of reconstruction was 48.7 years (range 28–76 years). 81 women (58.3 %) were premenopausal at the time of breast cancer diagnosis. The most common tumor-type was invasive ductal carcinoma (69 %, $n = 93$), followed by ductal carcinoma in situ (DCIS) 18 %, $n = 25$. Most patients had a pT1 tumor (36 %, $n = 48$), 30 % ($n = 40$) had tumor size between 2 and 5 cm, 11 % ($n = 14$) presented with a pT3 tumor and 2 % ($n = 3$) with a pT4 tumor. 22 % ($n = 29$) had a DCIS (ductal carcinoma in situ) or CLIS (lobular carcinoma in situ) of the breast.

42 % of the patients had node-negative breast cancer. Grading was distributed as follows: 3 % G1, 47 % G2 and 35 % G3. In 15 % of the patients grading was not specified. Ninety women had hormone receptor-positive and 17 hormone receptor-negative tumors. In 32 patients hormone receptors were unknown. Furthermore, 66 patients (49.9 %) were Her-2/neu negative (IRS 0 or 1) and 26 (19.7 %) were positive. 83 women (59.7 %) underwent (neo)adjuvant chemotherapy, which was carried out according to the prevailing AGO guideline recommendations [9]. Postoperative radiotherapy was performed in 50 women (36 %). 88 women (63.3 %) received adjuvant endocrine therapy with tamoxifen, 31 (22.3 %) aromatase inhibitors and 15 women sequential therapy using tamoxifen and aromatase inhibitors. Premenopausal women also received GnRH analogues.

Reconstructive methods and limitations

The distribution of the different surgical techniques is shown in Fig. 1. Eleven patients received a single LAT reconstruction, 63 additional silicone prosthesis, 26 TRAM and 39 reconstructions using single silicone prosthesis. In 37.4 % ($n = 27$) additional nipple reconstruction was performed.

Questionnaire

Due to the size of subsamples it was not always possible to evaluate all items for each reconstruction method separately. Some questions could be answered with multiple entries.

The overall response rate to the questionnaire was 89 patients (64.7 %), of which 41 patients with LAT plus prosthesis, 11 with a single LAT, 13 with a TRAM and 24 with a single prosthesis.

After reconstruction, 32 patients (35.9 %) experienced one or more complications such as infection, hematoma, hemorrhage, necrosis or seroma.

The principal reason for breast reconstruction was a feeling of unattractiveness (86 %; $n = 76$). The choice of reconstructive method was mostly based on the advice of the responsible physician or medical team (80.9 %; $n = 72$). Almost one-fifth of women gathered information themselves via the internet, magazines or discussion

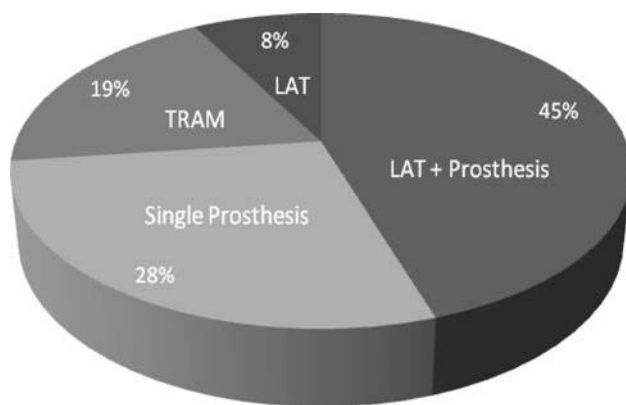


Fig. 1 Reconstruction methods and their distribution in the patient cohort. *LAT* latissimus dorsi, *TRAM* tram flap. LAT and prosthesis were most common in this patient cohort, followed by single prosthesis, TRAM and single LAT

groups. In one of ten patients, the decision for breast reconstruction was made with the help of other affected women. 70 % ($n = 62$) of the patients reported that they had been actively involved in the decision making process.

Mental and physical stress

Patients had on average 2.13 reconstructive surgeries (standard deviation 1.04, range 1–5). The burden resulting from several hospital stays was 4.06 on average (standard deviation 3.31, potential range of scores 0–10). About 36 % ($n = 32$) of the patients rated the hospital stays as “not onerous” but 8 % ($n = 7$) as “very stressful”. The reconstruction with prosthesis was considered as the least burdensome method. There was no significant correlation between the reconstructive method and the burden of multiple operations ($p = 0.661$).

Perioperative pain

The average pain score after reconstructive breast surgery was 4.08 on a 10 point scale (standard deviation 3.06). Patients with the construction methods LAT + prosthesis ($n = 20/41$, 48.8 %) or sole prosthesis ($n = 13/24$; 54.2 %) mostly stated to have no pain. Patients reconstructed by TRAM-flap had severe pain in 46.2 % ($n = 6/13$) of the cases. The relationship between reconstruction method and intensity of perioperative pain was not significant ($p = 0.624$; Table 4).

61 (68.5 %) patients had a postoperative sensory deficit in the reconstructed area, but there was no correlation with the type of reconstructive method.

Movement restriction and chronic pain

About 50 % ($n = 32$) of the women who received an autologous reconstruction were restricted in movement.

Table 4 Quality of life by reconstructive method

Variable (possible range)	Single prosthesis m(sd)	LAT + prosthesis m(sd)	LAT m(sd)	TRAM m(sd)
Burden of procedure (0–10)	4.3	4.0	–	4.4
Perioperative pain (0–10)	3.7	4.2	4.0	4.7
Movement restriction and chronic pain (0–10)	0.4	0.9	1.0	0.5
Sexuality (0–3)	0.7	0.7	0.4	0.7

Values are presented as mean values of a possible range (either 0–10 or 0–3 point scale)

LAT latissimus dorsi flap, *TRAM* tram flap

In the alloplastic group, this occurred only in about 30 % ($n = 8$) of cases. On average, the level of chronic pain was rather low with 1.34 (standard deviation 2.09, range 0–10). There was a significantly stronger movement restriction in patients with LAT than TRAM reconstruction ($p = 0.009$).

There was no significant correlation between the type of reconstruction and the presence of chronic pain ($p = 0.309$; Table 4).

Sexuality

81/89 patients answered these questions. Patients were asked whether they experienced 0 “no changes”, 1 “mild changes”, 2 “mean changes” and 3 “strong changes” in sexuality after breast reconstruction. Almost 60 % ($n = 48$) of the patients did not report changes in their sexual experience. 5 % ($n = 4$) mentioned postoperative positive experiences, such as increased self-consciousness. 20 % ($n = 16$) felt strongly and 16 % ($n = 13$) moderately impaired after reconstruction in their sexual experiences. In 4 % ($n = 3$) patients felt a “very” strong and in 10 % ($n = 8$) a “fairly” strong decline of perceived femininity. About 40 % ($n = 32$) believed that their femininity faded “a little”, but most women (47 %, $n = 38$) observed no effect (Table 4). Age did not affect self-evaluations of sexual experiences after reconstruction. Similarly, satisfaction with the cosmetic outcome was high, with 78.7 % ($n = 70$) reporting satisfaction with the cosmetic result.

Importance of counseling

84 % ($n = 75$) of women felt well informed by the medical team. Patients’ ratings of the quality of the information and recommendation they had received were associated with the extent of complications after the reconstruction procedure ($p = 0.008$). As shown in Fig. 2, most patients

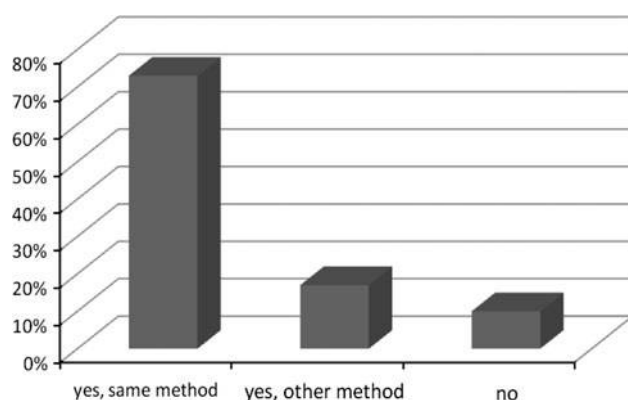


Fig. 2 Potential choice of repeat breast reconstruction. The figure shows that most patients would opt for the same method

would opt again for the method of breast reconstruction they had initially chosen, and this congruence was significantly correlated with a patients' satisfaction with the presurgical medical consultation ($p < 0.001$).

Satisfaction

70/89 patients (78.7 %) were satisfied with the cosmetic result of the reconstruction, especially with size (83 %, $n = 75$) and symmetry (69 %; $n = 52$). Of the reconstructive procedures, the prosthetic reconstruction turned out to be least favored one (44 % unsatisfied). Neither chronic pain, nor a possible restriction of movement or a sensory disturbance of the surgical area had a statistically significant impact on satisfaction. However, a correlation between the presence of scars and the overall satisfaction with the visual result emerged ($p = 0.014$). Furthermore, satisfaction with the visual outcome of the breast was significantly correlated with women's body image after reconstruction ($p = 0.001$). Patients, who felt well informed, were satisfied with the optical results in 88 % ($n = 66/75$) of cases. A poor consultation was associated with greater dissatisfaction with the result (60 %). There were no statistical correlations between postoperative satisfaction with the cosmetic result and the breast size before or after surgery, cosmetic surgery on the contra-lateral breast, or reconstruction of the nipple.

Results of the Body Image Scale

81/89 (91.0 %) responses were available on the Body Image Scale questionnaire. Patients ($n = 69$) with primary reconstruction reported less impairment in body image compared to women ($n = 12$) with secondary reconstruction [9.01 (4.74) vs. 11.92 (7.25)]. Breast cancer patients who underwent reconstruction from muscular tissue ($n = 60$) had better body image outcomes than those with

prosthesis ($n = 21$) [8.92 (4.71) vs. 10.95 (6.38)]. Furthermore, LAT reconstruction ($n = 46$) was associated with more impairments in body image than TRAM reconstruction ($n = 14$) [9.24 (5.01) vs. 7.86 (3.51)]. However, none of these differences reached statistical significance. Body image was neither related to age at diagnosis nor to the age of the women after breast cancer at the time of assessment.

Discussion

In this patient cohort, clinical characteristics were comparable with samples of previous studies [10], as was the incidence of postoperative complications [11–14].

In healthy women who underwent prophylactic mastectomy and subsequent reconstruction with prosthesis, 25 % reported limitations in everyday activity [15]. Our results were similar: nearly a third of the patients with an alloplastic reconstruction reported functional impairments. Most studies focused only on the appearance of the breast and the satisfaction with the reconstructed breast [15–22]. In addition, we evaluated patients' body image and aspects of femininity.

Several other studies focused on a single [17, 21, 23] or two different [24, 25] reconstruction methods to evaluate, e.g., patient satisfaction [26]. Only very few studies compared more than two different reconstructive methods in terms of patient satisfaction [16, 27]. Having been offered several reconstructive techniques, nearly 80 % of the women in our patient cohort were satisfied with the cosmetic result. Furthermore, our results were consistent with other studies [28] on patient satisfaction with breast reconstruction after mastectomy, suggesting high patient satisfaction rates. The results are inconclusive as to whether the type of reconstructive method is associated with satisfaction [28–33]. In accordance with other studies [28, 32, 33], our findings could not identify a correlation between reconstructive procedure and patient satisfaction.

Perceptions of body image varied between reconstructive methods and whether the reconstruction was conducted immediately after primary breast surgery or delayed. However, due to the small sample sizes for subgroup analyses none of these differences were statistically significant. More impairments in body image were reported by women who had delayed reconstruction. More impairment in body image in survivors with prosthesis reconstructions also corresponded to the greater extent of reported functional impairments in this patient group.

The extent of deteriorations in body image, that was reported in the literature [7], exceeds data of samples with mixed types of reconstructions after mastectomy whose scores were within 4–7 on the body image scale. Our

findings suggest that meaningful differences exist between different types of reconstructive methods in terms of their consequences for quality of life. However, these preliminary findings need to be studied in larger samples and preferably in a longitudinal design.

Interestingly, impairments in body image were not associated with the patients' age at the time of completion of the survey or their age at diagnosis. This finding suggests that reconstructive surgery acts similarly on women's body integrity, independent of their age.

The single item with the greatest impact on women's satisfaction with the cosmetic result was breast size (83 %, $n = 75$). Satisfaction with breast symmetry after unilateral reconstruction was lower (69 %; $n = 52$). Another study [21] with a 10-year follow-up found somewhat lower satisfaction scores: for LAT plus prostheses reconstruction 76.5 % were satisfied with the size and 41.4 % with the symmetry of the breast. Because of different length of follow-up, these results are difficult to compare. However, Gerber and co-authors [20, 34] showed in a re-assessment at 101 months that satisfaction with the cosmetic result did not significantly change since a previous 6-year follow-up assessment. In contrast, physicians' ratings of cosmetic outcomes differed from patients' self-report, such that experts reported a significant decline in the cosmetic outcome from 6- to 10-year follow-up.

Satisfaction with the reconstructed breast and perceptions of body image also affect sexuality. In total, about one-third of the patients stated that they felt strongly or moderately compromised in their sexual experience post reconstruction. This percentage is concordant with previous studies, which reported 21–44 % of breast cancer survivors with sexual problems [15, 18, 35]. Only 10 % of those patients for whom sexuality played a minor role before surgery reported decrements in sexuality after reconstruction. Patients, who were satisfied with surgery and with body image, also showed greater sexual satisfaction. Meanwhile, there are certain options for the management of sexual problems [36] post-breast reconstruction.

The reason for undergoing reconstructive surgery of the breast was the decrements in a women's sense of femininity and feelings of being unattractive (86 %). In this regard, our findings are consistent with the study of Contant and co-authors, who analyzed breast reconstruction with prosthesis [37].

In a study on women's preferences with regards to counseling, 64 % of patients wanted advice concerning the reconstruction of the breast by their attending physician [38]. In our patient cohort, the majority of patients (70 %) felt involved in the decision making process. Our data showed that 84 % of women felt well and 16 % poorly advised by the medical team. Counseling needs were especially high for decisions regarding further reconstructive

surgery post-cancer recurrence [39]. In our study, 90 % of 89 women being interviewed would have opted again for breast reconstruction. Fifteen patients, however, would have chosen a different method. Comparable data are reported regarding the mentions for re-election of the same method in the literature (ranging from 71 to 90 %) [15, 21, 24].

Clinical implications

Overall, the results of this study suggest a low rate of complications and high patient satisfaction post reconstruction. Indeed, studies which compared patients after mastectomy without and with reconstruction showed a significant benefit of reconstruction over simple mastectomy in terms of women's body image [7]. With regards to surgical decision making, women should be advised that reconstructions with prosthesis can be associated with a greater risk for functional impairments and worse psychological adjustment. The results of this retrospective investigation also stress the importance of detailed preoperative counseling to facilitate postoperative adjustment to reconstructive surgery after mastectomy. Importantly, a favorable effect on body image outcomes in breast cancer survivors had been shown in a prospective study when patients were able to participate in treatment planning [40].

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Conflict of interest None.

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