



Latissimus dorsi breast reconstruction with or without implants: A comparison between outcome and patient satisfaction

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KEYWORDS

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Summary Background: The latissimus dorsi (LD) flap is largely used in breast reconstruction. The aim of this study is to evaluate and compare the advantage of the LD flap in association with an implant to that of LD flap in association with lipofilling to add additional volume following breast reconstruction by assessing the number of revision procedures, length of hospitalization, complication rate, and patient satisfaction.

Methods: A retrospective cohort study was performed to evaluate complication rate, number and type of revision procedures required, hospitalization time, and overall duration of the reconstructive process in patients undergoing LD breast reconstruction in our department between January 2012 and March 2015. Patient satisfaction was assessed using BREAST-Q®.

Results: Ninety-five breast reconstructions performed on 90 patients were included. In 38 patients, 42 breasts were reconstructed using LD flap in association with lipofilling (Group 1). In the remaining 52 patients, 53 breast reconstructions were performed using LD flap in association with an implant (Group 2). Findings concerning total hospitalization time, overall duration of the reconstructive process, and the distribution of supplementary surgical procedures demonstrated no statistically significant differences between the two groups. However, the surgical complication rate was higher in Group 2 than in Group 1 (14.2% vs. 18.8%, respectively). Regarding BREAST-Q, a detailed analysis of the “satisfaction with breasts” domain showed a higher score for Group 1 than for Group 2.

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Conclusions: The association of a breast implant with LD reconstruction does not decrease breast reconstruction time in terms of the number of revision procedures and hospitalization time, exposes patients to a higher complication rate, and does not improve patient satisfaction. © 2018 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

Introduction

The latissimus dorsi (LD) flap is one of the best options for both immediate and delayed breast reconstructions.¹⁻⁹

Generally, the achievement of an ideal volume and shape is extremely demanding in a single-stage reconstruction, especially when using LD flaps. During the past few decades, to improve the final volume, numerous alternatives have been proposed, including the extended LD myocutaneous flap introduced by Hokin¹⁰ and made popular by Delay.¹¹

To avoid any shortfalls in the final volume, the LD flap can be further increased at the time of its harvest by the addition of breast implants. The risk of infection, extrusion, rupture, capsular contracture, poor cosmetic outcome following radiotherapy, and a recently suggested association with anaplastic large cell lymphoma are the main disadvantages of using implants.¹²⁻¹⁵ Moreover, a certain number of LD flaps associated with implants may require several fat grafting sessions to improve the final result.¹⁶

For these reasons, there is no consensus in defining the most reliable technical approach as being breast reconstruction with an LD flap.

The aim of this study is to evaluate and compare the advantage of the LD flap in association with implants to that of the autologous LD flap in association with a variable number of lipofilling additional procedures following breast reconstruction by assessing the number of revision procedures, hospitalization time, complication rate, and patient satisfaction.

Methods

Study population

From our institution's digital database, we identified 118 women who had undergone breast reconstruction with an LD flap between January 2012 and March 2015 (Figure 1).

Both immediate and delayed reconstructions, performed after therapeutic or prophylactic mastectomies, were included. Both unilateral and bilateral breast reconstructions were included. Only patients with a minimum of one year of follow-up were included.

Exclusion criteria included patients who had interrupted their surgical itinerary for health or personal reasons and patients who had undergone LD as a lifeboat flap following previous breast reconstruction failure.

Four deaths due to metastasis were excluded together with LD reconstructions following extensive radionecrosis or breast angiosarcomas.

Our study population was divided into two main groups: Group 1 patients operated on using an LD flap with addi-

tional lipofilling and Group 2 patients operated on using an LD flap with implants.

All reconstructions were performed by a single senior surgeon. Flap design was conceived to conceal the future scar inside the bra. Flap harvest routinely preserved the thoracodorsal nerve and the humeral insertion. In delayed reconstructions, all mastectomy scars were excised and sent for histologic analysis. In Group 2, a round textured cohesive silicone gel implant was added.

In unilateral reconstructions, a contralateral symmetrization could be performed if needed during second-stage surgery using the most appropriate technique (reduction mammoplasty or implant-based augmentation mammoplasty).

Data collection and BREAST-Q

Retrospective data collection was performed for patients' characteristics, complication rate, number and type of revision procedures, hospitalization time, and overall duration of the reconstructive process.

Patient satisfaction was evaluated using the BREAST-Q form. Questionnaires were sent to the patients by mail, and a stamped addressed envelope was provided for the return of the questionnaire. Nonresponders were contacted several times to increase the return rate.

The BREAST-Q questionnaire is a validated, procedure-specific, patient-reported measurement to assess health-related quality of life and patient satisfaction after breast reconstruction.¹⁷⁻²⁰ The postoperative reconstruction module includes 103 questions divided into the following two themes:

1. Patient satisfaction; and
2. Health-related quality of life.

Satisfaction domains include

- Satisfaction with breasts
- Satisfaction with outcome
- Satisfaction with nipples
- Satisfaction with information
- Satisfaction with surgeon
- Satisfaction with medical staff
- Satisfaction with office staff

Quality of life domains include

- Psychosocial well-being
- Sexual well-being
- Physical well-being

The abdominal evaluation was not reported, as it was not applicable to LD reconstruction. Furthermore, in Group 2,

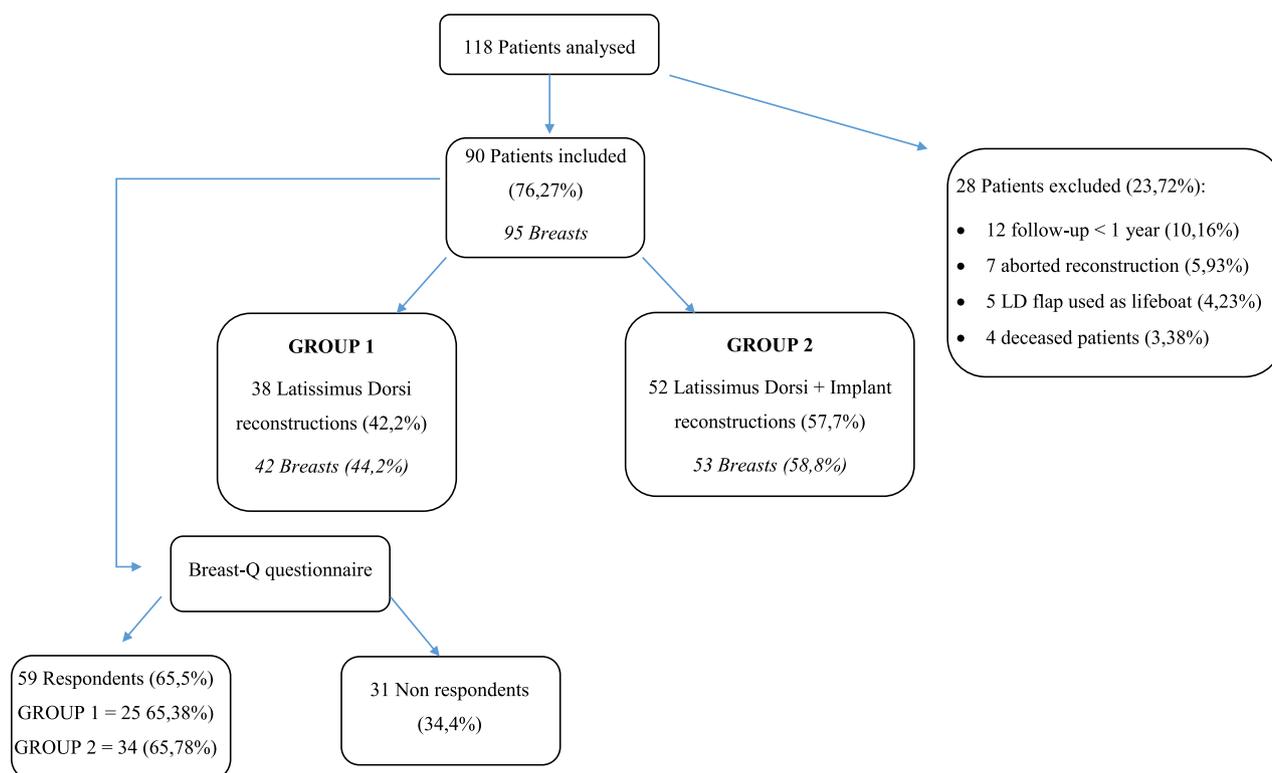


Figure 1 Study design.

the “satisfaction with breasts” domain was integrated with supplementary questions related to the use of implants.

The patients’ answers to each scale item were transformed using Q-Score software, which converts rough survey scores from 1 to 3 or to 5 to continuous scores, thus generating a total score ranging from 0 to 100. Higher scores indicate greater satisfaction or function.^{21,22}

Statistical analysis

Statistical analyses were performed using IBM® SPSS® 22.0. Categorical variables were assessed using Pearson’s chi-square test or Fisher’s exact test when applicable. The Mann-Whitney U test was used for all numerical variables to compare changes in mean scores. A p -value < 0.05 was considered significant. The duration of follow-up and the time between the first and the last intervention were considered in statistical analysis as a “year fraction” (e.g., 18 months = 1.5).

Results

Ninety-five breast reconstructions performed in 90 patients were included (age range 26–73, mean age 52.5 years).

In 38 patients, 42 breasts were reconstructed using the LD flap in association with lipofilling (Group 1; Figure 2). In the remaining 52 patients, 53 reconstructions were performed using the LD flap in association with an implant (Group 2; Figure 3).

Table 1 summarizes the demographic characteristics and main patient clinical record data. No differences in baseline characteristics such as age, active smoking, history of radiotherapy, and chemotherapy were observed between two cohorts. The average time of follow-up was longer for Group 2 than for Group 1 (2.2 vs. 1.4 years, respectively). On the contrary, body mass index (BMI) was significantly higher in Group 1 than in Group 2 (28.1 vs. 24.5, respectively).

The hospitalization time recorded showed no statistically significant differences between the two groups ($p = 0.36$).

Overall duration of the reconstructive process from the first to the last surgical procedure was similar in both groups ($p = 0.329$).

In addition, the distribution of total supplementary surgical steps did not show statistically significant difference in the two groups ($p = 0.31$).

Nevertheless, patients in Group 1 underwent a higher rate of fat grafting sessions than those in Group 2 ($p = 0.013$; Table 2).

No significant difference in the rate of systemic complications between the two groups was detected (3.7% vs. 2.3% for Groups 2 and 1, respectively), with one case of embolism and one case of malignant hyperthermia in Group 2, and one case of deep vein thrombosis in Group 1.

The surgical complication rate was higher in Group 2 than in Group 1 (14.2% vs. 18.8%, respectively). In Group 1, the most frequent complications observed were hematoma and seroma (4.7%), whereas in Group 2, the most frequent complications were implant infection and hematoma (5.6%), followed by seroma and implant extrusion (3.7%; Table 3).

A higher number of patients received radiotherapy in Group 2 than those in Group 1. Moreover, as shown in



Figure 2 Final result of latissimus dorsi breast reconstruction without implant.

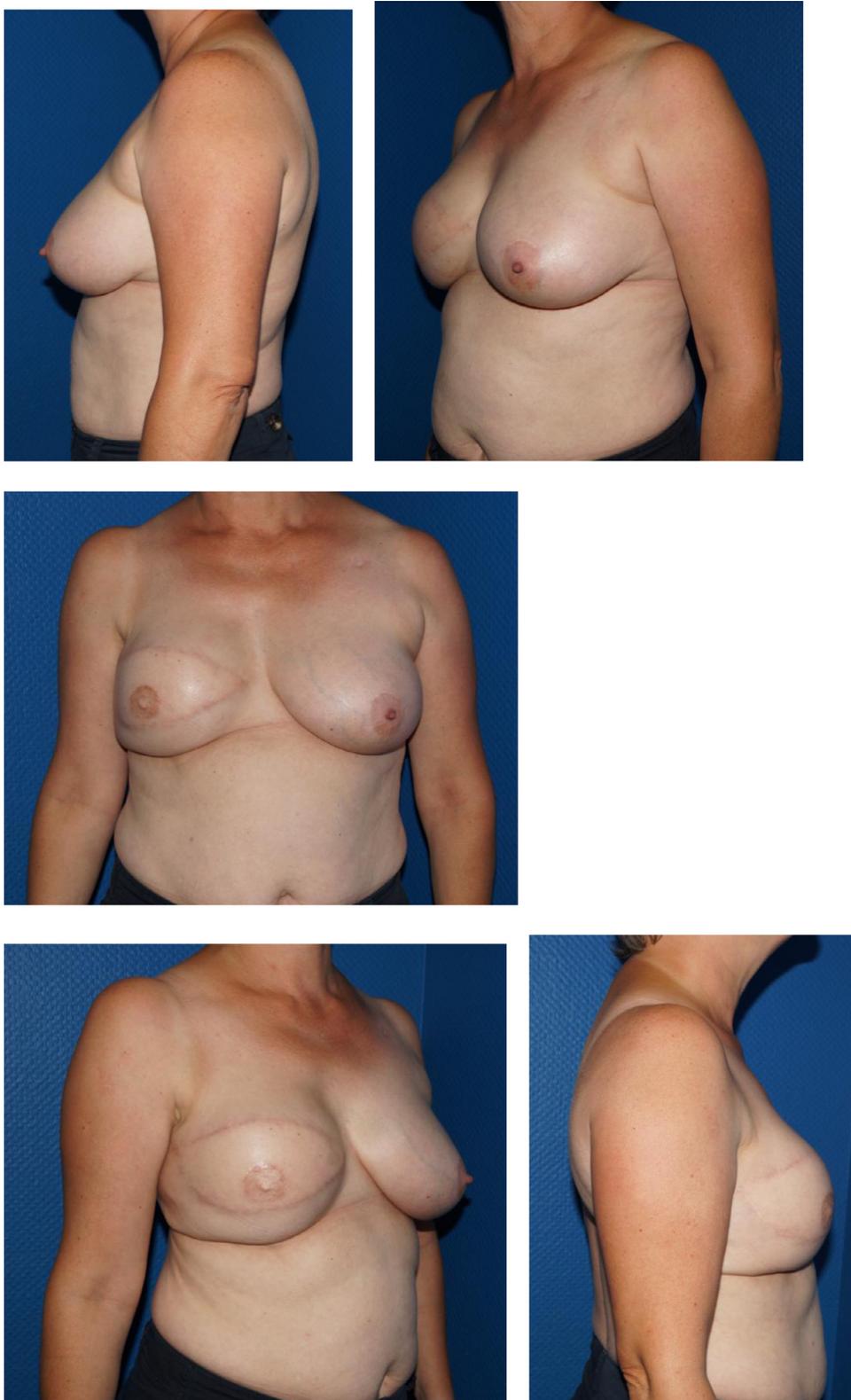


Figure 3 Final result of a latissimus dorsi breast reconstruction with implant.

Table 1 Demographic features and medical record data.

	GROUP 1	GROUP 2	p
Number of patients	38	52	
Age, years, mean (CI)	53.3 (49.3-57.3)	53 (50.1-55.9)	0.873
Follow-up, years, mean (CI)	1.4 (1-1.7)	2.2 (1.9-2.5)	<0.001
BMI, Kg/m ² , mean (CI)	28.1 (26.7-29.5)	24.5 (23.2-25.9)	<0.001
History of radiotherapy	22	41	0.002
History of chemotherapy	30	41	0.523
Active smoking	2	7	0.711

CI: Confidence Interval.

Table 2 Outcomes of breast reconstruction.

	GROUP 1	GROUP 2	p
Patients, n	38	52	
Reconstructions, n	42	53	
Laterality			
Unilateral, n (%)	34 (89.5)	51 (98)	
Bilateral, n (%)	4 (10.5)	1 (1.9)	
Timing			
Primary (immediate) n (%)	2 (4.8)	2 (3.8)	
Secondary (delayed) n (%)	40 (95.2)	51 (96.2)	
Additional operations			
Total, mean (CI)	1.57 (1.22-1.93)	1.40 (1.12-1.67)	0.31
Lipofilling, mean (CI)	1.13 (0.81-1.44)	0.64 (0.42-0.85)	0.013
Implants for correction of asymmetry, n	0	3	0.251
Mammoplasty reduction for correction of asymmetry, n	17	18	0.549
Nipple reconstructions, n	14	30	0.051
Esthetic retouches, mean (CI)	0.45	0.13	0.003
Complications, mean (CI)	0.05	0.1	0.449
Substitution of implant, mean (%)	0	0.21 (18.8)	
Hospitalization time, days, mean (CI)	10.81 (9.07-12.55)	10.54 (9-12.07)	0.361
Duration of reconstructive process, years, mean (CI)	0.82 (0.63-1.01)	0.77 (0.58-0.96)	0.329

CI: Confidence Interval.

Table 3 Surgery-related complications.

	GROUP 1 (%)	GROUP 2 (%)
Total	14.2	18.8
Hematoma	4.7	5.6
Seroma	4.7	3.7
Infected wound	2.4	0
Flap necrosis		
Partial <75%	2.4	0
Total, >75%	0	0
Implant extrusion	/	3.7
Implant Infection	/	5.6

Table 4, an increased number of total additional operations were observed in Group 2 patients who received radiotherapy than in Group 1 patients who did not receive radiotherapy (53 vs. 10, respectively). Nevertheless, considering the two groups, no significant difference was observed between patients who received radiotherapy or those who did not in terms of the number of additional surgery treatment, additional lipofilling, esthetic retouches, and complications.

Results for BREAST-Q domains are reported in Table 5. The overall return rate of the BREAST-Q was 62%. The lowest mean score observed in Group 2 regarded the sexual well-being domain (60.4). Group 1 recorded its lowest mean score in the "satisfaction with information" domain (65.6).

With regard to the domain "satisfaction with breasts," Group 1 patients were slightly more satisfied than Group 2 patients, but the difference was not significant (70.2 vs. 61.7, respectively; $p=0.08$).

Group 2 patients were significantly less satisfied than Group 1 patients with regard to the "sexual well-being" domain ($p=0.03$).

On the other hand, Group 2 gained a significantly higher score than Group 1 in the "satisfaction with office staff" domain (97.6 vs. 82.2; $p=0.008$, respectively).

A detailed question-by-question analysis of each BREAST-Q domain revealed only a few items that showed significant difference within the two groups (Table 6). The analysis of the domain "satisfaction with breasts" showed five questions with statistically significant differences. Group 1 patients had a higher score regarding the questions "how you look in the mirror clothed" ($p=0.028$), "the softness of your reconstructed breast(s)" ($p=0.002$), "how natural your reconstructed breast(s) looks" ($p=0.017$), "how your

Table 4 Relationship between radiotherapy and outcome.

	GROUP 1		p	GROUP 2		p
	RT	Not RT		RT	Not RT	
Patients	22	16		41	11	
Total additional operations	33	27	0.569	53	10	0.390
Additional lipofilling	24	19	0.630	24	5	0.453
Esthetic retouches	11	6	0.737	6	0	0.593
Complications	1	1	0.942	4	1	0.792

RT: Radiotherapy.

reconstructed breast(s) look now compared to before you had any breast surgery" ($p=0.044$), and "how you look in the mirror unclothed" ($p=0.013$).

For the domain "psychological well-being," Group 1 patients showed a higher score than Group 2 patients regarding the question "self-confidence" ($p=0.018$). Equally concerning the domain "physical well-being," Group 1 patients exhibited higher scores of satisfaction than Group 2 patients for the question "rib pain" ($p=0.030$).

On the contrary, Group 2 patients showed a higher score than Group 1 patients regarding the questions "tightness in your breast area" ($p=0.005$) and "nagging feeling in your breast area" ($p=0.036$).

For the domains "satisfaction with information" and "satisfaction with office staff," a number of answers with statistically significant difference were observed.

No differences were observed regarding the domains "satisfaction with outcome," "satisfaction with nipple," "satisfaction with plastic surgeon," and "satisfaction with medical team."

Discussion

Many options exist for postmastectomy breast reconstruction, which are typically grouped as alloplastic, autologous, and a combination of both.²³

The type of breast reconstruction is a multifactorial decision based on several factors including size and shape of the native breast, location and type of cancer, need for adjuvant radiation therapy and/or chemotherapy, mastectomy scar as well as surgeon's preference and experience, and patient's intrinsic features.

Ideally, autologous breast reconstruction is recognized as the best choice by providing the patient with a natural breast that can be easily integrated into her body image.²⁴⁻²⁶

The LD flap regained popularity during the last decade as a result of its relative simplicity combined with the extremely reliable and consistent vascularity of the flap.^{9,27}

Many surgeons support the addition of a breast implant to improve volume and to reduce the duration of the reconstructive process particularly in thin patients with cup B/C breasts.²⁸⁻³² For these patients, indeed, it is not always possible to perform a breast reconstruction based exclusively on the LD flap compared with patients with a larger breast, a higher BMI, and greater fat deposit.³³ Nevertheless, the use of an alloplastic material exposes patients to implant-related complications.¹²⁻¹⁵

In selected cases with a small breast volume, variations in the LD flap have been suggested to increase its volume and to avoid the use of an implant.²⁹ The so-called "extended latissimus dorsi flap" described by Delay includes lumbar, parascapular, and scapular fat to improve flap volume^{11,34,35} with 30% of donor-site wound problems such as dehiscence and necrosis.^{36,37} Moreover, Santanelli describes an LD flap coupled with intraoperative fat grafting to provide an immediate total autologous breast reconstruction.³⁸

Although several studies evaluate and compare the benefit and patient satisfaction of autologous breast reconstruction with those of implant-based breast reconstruction,³⁹ no study compares the benefit of total autologous LD breast reconstruction with an LD flap in association with implants.

The main purpose of this study was to evaluate whether the LD flap in association with an implant has a real advantage compared to autologous LD breast reconstruction in association with a variable number of lipofilling additional procedures in terms of the total number of revision procedures, hospitalization time, complication rate, and patient satisfaction.

With regard to the total duration of reconstructive process, there were no significant differences between the two groups. In our experience, these findings demonstrated that the use of breast implants does not decrease breast reconstruction time.

Similarly, findings concerning the total hospitalization time demonstrated no significant differences between the two groups.

Regarding revision procedures, although Group 1 patients received a higher number of fat grafting sessions ($p=0.013$) and esthetical touch-up procedures ($p=0.003$) than Group 2 patients, the distribution of overall additional operations was similar in both groups ($p=0.31$). Indeed, Group 2 patients underwent additional operations related to the implant, with an implant substitution rate of 18.8%, which did not concern Group 1.

In addition to this, the surgical complication rate was higher in Group 2 than in Group 1 (18.8% vs. 14.2%, respectively) and was mostly related to implant infection (5.6%) and implant extrusion (3.7%).

According to our data, radiotherapy is not related to the higher incidence of complication in Group 2. In both groups, indeed, no significant difference was observed between patients who did and did not undergo radiotherapy neither concerning complications nor in terms of the number of additional surgery treatment, additional lipofilling, and esthetic retouches.

Table 5 Results of BREAST-Q domains.

Domain	Completed	Mean score (range 0-100)	SD	Difference in SD between groups	p-value
Satisfaction with breasts					
GROUP 2	34	61.73 (53.71-68.76)	23.00633		
GROUP 1	25	70.2 (60.53-79.87)	24.2719	1.26557	0.089
Satisfaction with outcome					
GROUP 2	34	76.79 (70.74-82.84)	17.33936		
GROUP 1	25	83.92 (77.23-90.61)	16.2145	1.12486	0.103
Psychosocial well-being					
GROUP 2	34	71.26 (63.87-78.65)	21.17647		
GROUP 1	25	75.48 (65.38-85.58)	24.46446	3.28799	0.2984
Sexual well-being					
GROUP 2	30	60.47 (51.19-69.74)	24.83842		
GROUP 1	22	76.54 (63.33-89.76)	29.80848	4.97006	0.039
Physical well-being: chest					
GROUP 2	24	67 (55.17-78.83)	28.01552		
GROUP 1	13	68.69 (52.91-84.48)	26.11955	1.89597	0.962
Satisfaction with nipples					
GROUP 2	34	76.15 (70.99-81.3)	14.7815		
GROUP 1	25	81.28 (72.54-90.01)	21.1631	6.3816	0.076
Satisfaction with information					
GROUP 2	34	74.32 (67.06-81.59)	20.82062		
GROUP 1	25	65.64 (55.04-76.24)	25.68865	4.86803	0.221
Satisfaction with surgeon					
GROUP 2	34	88.12 (80.66-95.58)	21.3836		
GROUP 1	25	83.12 (73.69-92.55)	22.85155	1.46795	0.114
Satisfaction with medical staff					
GROUP 2	34	90.88 (83.01-98.76)	22.57213		
GROUP 1	25	87 (75.97-98.03)	26.73013	4.158	0.52
Satisfaction with office staff					
GROUP 2	34	97.68 (93.77-101.58)	11.19719		
GROUP 1	25	82.24 (70.36-94.12)	28.78119	17.584	0.008

For the BREAST-Q score, there were no significant differences between the two groups for the domains “sexual well-being” and “satisfaction with office staff”.

Indeed, Group 2 patients were significantly less satisfied than Group 1 patients with regard to the domain “sexual

well-being” ($p=0.03$), but they gained a significantly higher score in the domain “satisfaction with office staff” (97.6 vs. 82.2; $p=0.008$).

A detailed analysis of the BREAST-Q was useful to obtain additional information regarding our specific research questions.

Table 6 Question-by-question analysis of each BREAST-Q domain.

Satisfaction with breasts	GROUP 1			GROUP 2			P-value
	n	mean score	SD	n	mean score	SD	
How you look in the mirror clothed?	25	3.56	0.870	34	3.15	0.925	0.028
The shape of your reconstructed breast(s) when you are wearing a bra?	25	3.44	1.044	34	3.32	0.912	0.266
How normal you feel in your clothes?	25	3.48	0.918	34	3.41	0.821	0.467
The size of your reconstructed breast(s)?	25	3.36	0.907	34	3.15	0.925	0.308
Being able to wear clothing that is more fitted?	25	3.24	1.012	34	3.12	0.977	0.487
How your breasts are lined up in relation to each other?	25	3.20	0.764	34	2.97	1.114	0.660
How comfortably your bras fit?	25	3.20	1.190	34	3.29	0.871	0.766
The softness of your reconstructed breast(s)?	25	3.44	0.917	34	2.74	0.963	0.002
How equal in size your breasts are to each other?	25	3.04	0.978	34	2.79	1.038	0.345
How natural your reconstructed breast(s) looks?	25	3.52	0.770	34	3.00	0.953	0.017
How naturally your reconstructed breast(s) sits/hangs?	25	3.52	0.770	34	3.24	0.987	0.251
How your reconstructed breast(s) feels to touch?	25	3.08	1.038	34	2.62	1.101	0.093
How much your reconstructed breast(s) feels like a natural part of your body?	25	3.40	0.913	34	3.09	0.996	0.184
How closely matched your breasts are to each other?	25	3.04	1.020	34	2.74	1.024	0.225
How your reconstructed breast(s) look now compared to before you had any breast surgery?	25	3.52	0.918	34	3.18	0.904	0.044
How you look in the mirror unclothed?	25	3.28	0.891	33	2.64	0.994	0.013
Satisfaction with Breast (Implant only)							
The amount of rippling (wrinkling) of your implant(s) that you can see?							
The amount of rippling (wrinkling) of your implant(s) that you can feel?							
Satisfaction with Outcome							
Having reconstruction is much better than the alternative of having no breast(s).	25	3.00	0.000	34	2.94	0.238	0.221
I would encourage other women in my situation to have breast reconstruction surgery.	25	3.00	0.000	34	2.88	0.477	0.221
I would do it again.	25	2.96	0.200	34	2.91	0.287	0.470
I have no regrets about having the surgery.	25	2.92	0.400	34	2.85	0.435	0.317
Having this surgery changed my life for the better.	25	2.88	0.439	34	2.76	0.495	0.210
The outcome perfectly matched my expectations.	25	2.40	0.577	34	2.29	0.798	0.801
It turned out exactly as I had planned.	25	2.36	0.637	34	2.05	0.85	0.186
Psychosocial Well-being							
Confident in a social setting?	25	4.32	1.180	34	4.26	0.994	0.501
Emotionally able to do the things that you want to do?	25	4.28	1.308	34	4.32	0.768	0.287
Emotionally healthy?	25	4.48	1.159	34	4.41	0.783	0.156
Of equal worth to other women?	25	4.28	1.173	34	3.85	1.282	0.096
Self-confident?	25	4.52	1.046	34	4.03	1.058	0.018

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Table 6 (continued)

Satisfaction with breasts	GROUP 1			GROUP 2			P-value
	n	mean score	SD	n	mean score	SD	
Feminine in your clothes?	25	4.32	1.069	34	4.35	1.041	0.972
Accepting of your body?	25	4.32	1.145	34	3.94	1.205	0.096
Normal?	25	4.32	1.215	34	4.09	1.164	0.228
Like other women?	25	3.88	1.509	34	3.94	1.476	0.880
Attractive?	25	4.00	1.000	34	5.71	10.70	0.858
Sexual Well-being							
Sexually attractive in your clothes?	22	4.36	1.217	30	3.97	1.299	0.115
Comfortable/at ease during sexual activity?	21	4.14	1.276	28	3.71	1.41	0.205
Confident sexually?	21	4.19	1.167	29	3.62	1.321	0.074
Satisfied with your sex- life?	21	4.29	1.146	28	3.64	1.521	0.103
Confident sexually about how your breasts look when unclothed?	21	3.86	1.493	29	3.21	1.373	0.059
Sexy when unclothed?	21	3.95	1.499	29	3.31	1.365	0.060
Physical Well-being							
Neck pain?	25	1.60	1.190	34	1.35	0.812	0.478
Upper back pain?	25	2.12	1.453	34	2.06	1.229	0.947
Shoulder pain?	25	1.84	1.281	34	1.85	1.132	0.827
Arm pain?	25	1.96	1.369	34	2.21	1.452	0.465
Rib pain?	25	1.92	1.352	34	1.29	0.871	0.030
Pain in the muscles of your chest?	25	1.64	1.186	34	1.88	1.094	0.279
Difficulty lifting or moving your arms?	25	1.48	0.963	34	1.68	1.319	0.837
Difficulty sleeping because of discomfort in your breast area?	25	1.44	1.083	34	2.12	1.610	0.058
Tightness in your breast area?	25	1.60	1.291	34	2.56	1.561	0.005
Pulling in your breast area?	25	2.08	1.412	34	2.53	1.581	0.265
Nagging feeling in your breast area?	25	1.60	1.323	34	2.35	1.495	0.036
Tenderness in your breast area?	25	1.64	1.221	34	1.62	1.181	0.906
Sharp pains in your breast area?	25	1.36	0.907	34	1.50	0.961	0.512
Shooting pains in your breast area?	25	1.40	1.041	34	1.29	0.760	0.844
Aching feeling in your breast area?	25	1.36	1.036	34	1.29	0.799	0.847
Throbbing feeling in yours breast area?	25	1.40	1.155	34	1.41	0.821	0.366
Satisfaction with nipple							
The shape of your reconstructed nipple(s)?	13	3.23	1.013	24	3.04	1.042	0.582
How your reconstructed nipple(s) and areola(s) look?	13	3.15	0.899	24	3.21	0.932	0.790
How natural your reconstructed nipple(s) look?	13	3.08	0.954	24	3.17	1.007	0.695
The color of your reconstructed nipple/areolar complex?	12	3.00	0.853	24	2.92	0.974	0.908
The height (projection) of your reconstructed nipple(s)?	13	3.38	0.870	24	3.04	1.197	0.626
Satisfaction with information							
How the breast reconstruction was to be done?	25	3.52	1.005	34	3.76	0.654	0.337
Healing and recovery time?	25	2.84	1.179	34	3.68	0.684	0.003
Possible complications?	25	3.24	1.165	34	3.70	0.585	0.186
The options you were given regarding types of breast reconstruction?	25	3.56	0.870	34	3.79	0.479	0.425
The options you were given regarding timing of your breast reconstruction (i.e., same time as your mastectomy versus later)?	25	3.60	0.913	34	3.74	0.448	0.772

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Table 6 (continued)

Satisfaction with breasts	GROUP 1			GROUP 2			P-value
	n	mean score	SD	n	mean score	SD	
The pros and cons of the timing of your breast reconstruction?	25	3.36	1.075	34	3.53	0.706	0.913
How long the process of breast reconstruction would take from start to finish?	25	3.36	0.995	34	3.47	0.825	0.815
What size you could expect your breasts to be after reconstructive surgery?	25	3.28	1.137	34	3.44	0.746	0.965
How much pain to expect during recovery?	25	3.40	1.000	34	3.53	0.896	0.617
What you could expect your breasts to look like after surgery?	25	3.12	1.236	34	3.41	0.925	0.478
How long after reconstruction surgery it would take to feel like yourself/feel normal again?	25	3.08	1.288	34	3.12	1.149	0.851
How the surgery could affect future breast cancer screening (e.g., mammogram, self examinations)?	25	2.68	1.180	34	3.32	1.121	0.026
Lack of sensation in your reconstructed breast(s) and nipple(s)?	25	2.68	1.108	34	3.32	1.036	0.019
What other women experience with their breast reconstruction surgery?	25	2.84	1.344	34	2.56	1.375	0.400
What the scars would look like?	25	2.56	1.261	34	3.12	1.149	0.100
Satisfaction with Plastic Surgeon							
Was professional?	25	3.76	0.831	34	3.79	0.729	0.937
Gave you confidence?	25	3.68	0.852	34	3.82	0.626	0.405
Involved you in the decision-making process?	25	3.68	0.802	34	3.71	0.760	0.925
Was reassuring?	25	3.72	0.792	34	3.91	0.514	0.187
Answered all your questions?	25	3.72	0.843	34	3.82	0.626	0.671
Made you feel comfortable?	25	3.72	0.843	34	3.88	0.537	0.400
Was thorough?	25	3.80	0.707	34	3.76	0.741	0.661
Was easy to talk to?	25	3.68	0.802	34	3.71	0.760	0.893
Understood what you wanted?	25	3.72	0.678	34	3.68	0.768	0.930
Was sensitive?	25	3.04	1.020	34	3.50	0.929	0.060
Made time for your concerns?	25	3.64	0.757	34	3.62	0.922	0.662
Was available when you had concerns?	25	3.60	0.816	34	3.62	0.888	0.783
Satisfaction with Medical team (other than surgeon)							
Were professional?	25	3.68	0.748	34	3.79	0.729	0.251
Treated you with respect?	25	3.68	0.748	34	3.71	0.760	0.664
Were knowledgeable?	25	3.68	0.748	33	3.76	0.792	0.295
Were friendly and kind?	25	3.60	0.913	34	3.71	0.760	0.597
Made you feel comfortable?	25	3.60	0.913	33	3.73	0.719	0.608
Were thorough?	25	3.56	0.917	34	3.71	0.799	0.390
Made time for your concerns?	25	3.64	0.810	34	3.82	0.626	0.231
Satisfaction with Office staff							
Were professional?	25	3.56	0.870	34	3.94	0.343	0.007
Treated you with respect?	25	3.52	0.872	34	3.88	0.478	0.012
Were knowledgeable?	25	3.56	0.768	34	3.94	0.343	0.003
Were friendly and kind?	25	3.52	0.823	34	3.94	0.343	0.003
Made you feel comfortable?	25	3.44	0.961	34	3.94	0.343	0.003
Were thorough?	25	3.56	0.768	34	3.94	0.343	0.003
Made time for your concerns?	25	3.44	0.961	34	3.94	0.343	0.003

Although the main BREAST-Q result for the domain “satisfaction with breasts” did not show any significant difference between the two groups, answers to five of the questions showed significant difference. Particularly, the questions “the softness of your reconstructed breast(s)” ($p=0.002$) and “how natural your reconstructed breast(s) looks” ($p=0.017$) were interesting for our study and showed a higher score for Group 1 than for Group 2. The different approximate scores for these specific questions could be attributed to the implant. Indeed, the feel of the LD flap without the implant could provide a better sensation for the patients in terms of natural breast look and softness.

Conclusions

The association of a breast implant exposed patients following LD breast reconstruction to a high complication rate and additional surgical procedures such as implant substitution or removal.

Furthermore, our findings suggested that the association of a breast implant did not reduce the duration of LD breast reconstruction process.

Equally, the addition of an implant in the LD flap did not improve breast reconstruction in terms of the number of revision procedures and hospitalization time.

For patient satisfaction, LD breast reconstruction without implants provided greater satisfaction with regard to the natural aspect and softness of the reconstructed breast.

In conclusion, in our experience, breast reconstruction with an LD flap in association with implants had no real advantage compared to that with an LD flap in association with lipofilling to provide additional volume.

Ethical approval

This study conforms to the World Medical Association Declaration of Helsinki.

The research protocol was approved by the local ethics committee.

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None.

Conflicts of interest

None declared.

Ethical approval

Not required.

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