

University of Groningen

Which Breast Is the Best? Successful Autologous or Alloplastic Breast Reconstruction

Eltahir, Yassir; Werners, Lisanne L. C. H.; Dreise, Marieke M.; Zeiffmans van Emmichoven, Ingeborg A.; Werker, Paul M. N.; de Bock, Geertruida H.

Published in:
Plastic and Reconstructive Surgery

DOI:
[10.1097/PRS.0000000000000804](https://doi.org/10.1097/PRS.0000000000000804)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2015

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Eltahir, Y., Werners, L. L. C. H., Dreise, M. M., Zeiffmans van Emmichoven, I. A., Werker, P. M. N., & de Bock, G. H. (2015). Which Breast Is the Best? Successful Autologous or Alloplastic Breast Reconstruction: Patient-Reported Quality-of-Life Outcomes. *Plastic and Reconstructive Surgery*, 135(1), 43-50.
<https://doi.org/10.1097/PRS.0000000000000804>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Which Breast Is the Best? Successful Autologous or Alloplastic Breast Reconstruction: Patient-Reported Quality-of-Life Outcomes

Yassir Eltahir, M.D.
Lisanne L. C. H. Werners
Marieke M. Dreise
Ingeborg A. Zeijlmans van
Emmichoven, Ph.D.
Paul M. N. Werker, M.D.,
Ph.D.
Geertruida H. de Bock,
Ph.D.
Groningen, The Netherlands



Background: Breast reconstruction is an appropriate option offered to women who are diagnosed with breast cancer or gene mutations. It may be accomplished with implants or autologous procedures. This cross-sectional study evaluated the satisfaction and quality of life in addition to complications and secondary corrections in women after successful autologous or alloplastic (implant) breast reconstruction.

Methods: Women were included after successful breast reconstruction. The BREAST-Q instrument and standardized questionnaires on depression, recurrence concerns, and anxiety were sent by mail to the participants. In addition, data were collected on complications and secondary corrections. Multiple regression analysis and chi-square tests were applied to evaluate differences between the autologous breast reconstruction group ($n = 47$) and the implant breast reconstruction group ($n = 45$).

Results: Women with a successful autologous reconstruction were significantly more satisfied with their reconstructed breasts than women with successful alloplastic breast reconstruction as measured with the BREAST-Q satisfaction with breasts module ($p = 0.023$). More women with an autologous breast reconstruction required secondary correction than women with an implant breast reconstruction ($p = 0.012$). Other findings did not differ between the two groups.

Conclusions: Autologous breast reconstruction leads to more satisfaction than does implant breast reconstruction, notwithstanding that women with an autologous breast reconstruction more often required a secondary correction. The study found no ideal breast reconstruction suitable for all patients. However, this study may inform patients and medical teams in making decisions about breast reconstruction. This pilot study indicated several questions that we plan to further investigate in a larger prospective study. (*Plast. Reconstr. Surg.* 135: 43, 2015.)

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, III.

Breast reconstruction has become an appropriate option for women diagnosed with breast cancer, and it has been reported that 17 percent of mastectomy patients choose breast reconstruction.¹ Breast reconstruction is accomplished in various ways. The National Health Service national database reported immediate breast reconstruction in 67 percent of the breast reconstruction cases, directly following the mastectomy.¹ However, breast reconstruction is a secondary process (i.e., in 33 percent of the cases).¹

The main breast reconstruction procedures are the autologous and alloplastic techniques; the last technique is performed in 63 percent of cases.² The alloplastic breast reconstruction procedure uses tissue expanders or breast implants with or without a flap. Flaps may be local (e.g., lateral thoracodorsal or thoracodorsal artery perforator) or regional (e.g., latissimus dorsi muscle). The flap used most frequently for autologous breast reconstruction is the deep inferior epigastric perforator flap. Usually, nipple reconstruction and areola complex tattoo complete breast reconstruction. If

From the Department of Plastic Surgery, University Medical Centre Groningen.

Received for publication April 5, 2014; accepted June 27, 2014.

Copyright © 2014 by the American Society of Plastic Surgeons

DOI: 10.1097/PRS.0000000000000804

Disclosure: All authors declare they have no conflicts of interest regarding financial, personal, or other matters that might affect the information, research, analysis, or interpretation of this article.

necessary, a correction of the contralateral side is performed to improve symmetry. Therefore, many months may pass before the final intended aesthetic result of breast reconstruction is achieved.

Every breast reconstruction technique is associated with its own surgical complication and cost profile, and its own impact on quality of life. Fischer et al.³ concluded that free flap reconstructions required fewer surgical procedures, had lower rates of complications and failures, required fewer clinic visits, and achieved a final, complete reconstruction faster than expander/implant reconstructions. Ohkuma et al. showed that, although the quality of life of both groups was improved significantly postoperatively, autologous breast reconstruction had a lower physical functioning.⁴ Cordeiro and McCarthy⁵ found that 95 percent of the patients who had tissue expander/breast implants were satisfied with the results and said they would choose the same reconstruction type again. Satisfaction did not correlate with late complications; however, the study was set up without a reference population. Hu et al.⁶ found that patients with a transverse rectus abdominis musculocutaneous flap reconstruction were more satisfied with their breasts than the patients who received implants. We may conclude from the literature that publications on quality of life following the various breast reconstruction techniques used mainly standard instruments and draw ambiguous conclusions. There is a need for studies based on sensitive and condition-specific instruments.⁷

This study aimed to investigate which technique of breast reconstruction, alloplastic or autologous, results in the highest quality of life. For this reason, we surveyed women who experienced a successful breast reconstruction at our institution. We used the BREAST-Q patient-reported outcomes measure as the primary instrument to measure the quality of life and satisfaction outcomes.⁸ In addition, data on complications and secondary corrections were collected with widely used and validated questionnaires. We envision using the outcomes of this study to further tailor breast reconstruction procedures according to patients' needs. Moreover, the results can help us to reach the best possible patient counseling, treatment, and care.

PATIENTS AND METHODS

Study Population

We surveyed women who underwent breast reconstruction after mastectomy at the University Medical Center Groningen, Groningen, The Netherlands, between 2006 and 2010 (Fig. 1).

The study population consisted of two groups of women: the successful autologous breast reconstruction group, and the successful implant breast reconstruction group. A successful breast reconstruction was defined as having a unilateral or bilateral breast reconstructed successfully. The study included women with a good understanding of the Dutch language and who signed informed consent. The exclusion criteria were age younger than 18 years, legally incompetent women, the presence of metastasis or severe illness, reconstruction failure, and women who did not give informed consent. We received approval from the local medical ethics committee to conduct the study.

In the period from 2006 to 2010, breast reconstruction was performed in 152 women (Fig. 1). One hundred thirty-nine of these women were considered eligible and were asked to participate in the study. We received signed informed consent from 100 women; of them, eight were excluded as detailed in the flow diagram. A total of 92 women completed the questionnaires: 47 patients who had undergone autologous breast reconstruction and 45 patients who had undergone alloplastic breast reconstruction.

Methods

The recently published BREAST-Q patient-reported outcomes measure was used to appraise the outcome of breast reconstruction as perceived by the patients themselves.⁹ This is currently one of the few instruments in reconstructive breast surgery that meets international standards in terms of development and validation. The BREAST-Q is designed to gauge the impact of breast reconstruction on quality of life and satisfaction from the patient's perspective. The BREAST-Q (postoperative) reconstruction module consists of nine scales. Each scale consists of three to five items using a Likert scale. The score from each scale is transformed into a 100-point scale. Thus, each scale displays a score ranging from 0 (very dissatisfied) to 100 (very satisfied). All scales have a good internal consistency (Cronbach alpha varies from 0.88 to 0.97).¹⁰ Before starting the study, the Dutch versions of the questionnaires were validated in accordance with the protocol of the MAPI Trust (<http://www.mapi-trust.org/>). The back-translated versions were approved by Andrea L. Pusic, M.D., the author of the BREAST-Q. In addition, all patients of this study filled in the RAND 36-Item Health Survey,¹¹ the Hospital Anxiety and Depression Scale,^{12,13} and the Concerns About Recurrence Scale–Dutch Language Version.¹⁴

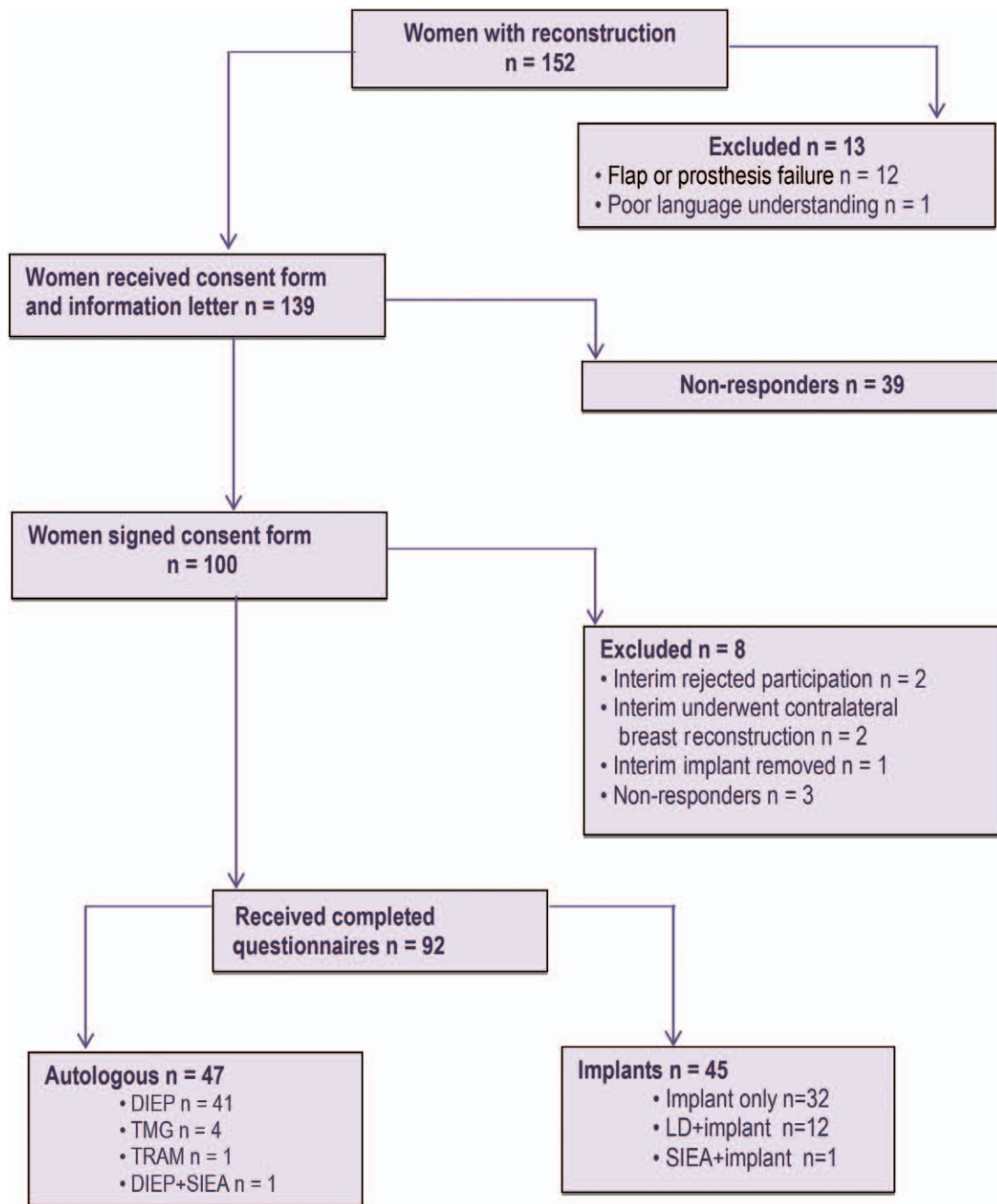


Fig. 1. Flow diagram. *DIEP*, deep inferior epigastric artery perforator; *TMG*, transverse myocutaneous gracilis; *TRAM*, transverse rectus abdominis musculocutaneous; *SIEA*, superficial inferior epigastric artery; *LD*, latissimus dorsi.

Information such as employment, educational level, marital status, and the time interval since the last treatment (Table 1) was obtained with the demographic questionnaire that was also used in the study by van den Beuken-van Everdingen et al.¹⁵ We retrieved clinical data and treatment stages from the patient files. In addition to the complications that had occurred, this registration included the American Society of Anesthesiologists classification, and comorbidities such as

diabetes mellitus, fibromyalgia, hypertension, and psychological instability. Data were collected concerning the complication and its treatment and follow-up period.

For analysis, disease progression was classified using tumor, node, metastasis staging and divided into two categories: stage 0 to IIB, and stage III to IIIC. Furthermore, complications were classified into three groups, according to the treatment that was given to the patient (i.e.,

Table 1. Characteristics of the Patient Groups

Characteristics	Autologous (%)	Implant (%)	<i>p</i>
No.	47	45	
Age at questionnaire completion, yr			0.001*
Median	51.0	44.0	
Range	35–78	26–62	
Age at mastectomy, yr			0.034*
Median	45.0	42.0	
Range	31–72	21–59	
Age at reconstruction, yr			0.002*
Median	49.0	42.0	
Range	31–74	22–59	
Time between first mastectomy and first reconstruction, mo			<0.001*
Median	21.0	0.0	
Range	0–135	6–90	
Time between the last reconstruction and questionnaires completed, mo			0.135
Median	26.0	23.5	
Range	5–52	4–48	
Comorbidity	11 (23.9)	6 (13.3)	0.213
BMI, kg/m ² †			<0.001*
Median	26.0	23.0	
Range	20–33	18–34	
BMI > 30 kg/m ² †	10 (22.2)	2 (4.5)	0.015*
Smokers	7 (15.2)	14 (31.8)	0.063
Chemotherapy	23 (48.9)	12 (29.3)	0.060
Radiotherapy	20 (43.5)	6 (13.3)	0.001*
Mastectomy‡			
Unilateral	33 (70.2)	16 (35.6)	
Bilateral	14 (29.8)	29 (64.4)	0.001*
Reconstruction			
Unilateral	34 (72.3)	15 (33.3)	
Bilateral	13 (27.7)	30 (66.7)	<0.001*
TNM staging§			
Stage 0–IIB	25 (71.4)	41 (95.3)	
Stage IIIA–IIIC	10 (28.6)	2 (4.7)	0.099
<i>BRCA1</i> or <i>BRCA2</i>	9 (19.1)	26 (57.8)	<0.001*
Reconstruction			
Primary	17 (36.2)	28 (62.2)	
Secondary¶	30 (63.8)	17 (37.8)	0.012*
Nipple reconstruction	32 (68.1)	24 (53.3)	0.147
Areola tattoo	26 (55.3)	16 (35.6)	0.057
Education¶¶			
Low	35 (74.5)	22 (50.0)	
High	12 (25.5)	22 (50.0)	0.016*
Partner#			
Single	7 (15.2)	7 (15.6)	
Partner	39 (84.8)	38 (84.4)	0.964

BMI, body mass index; TNM, tumor, node, metastasis.

*Significant.

†At reconstruction.

‡Autologous: unilateral malignancy, *n* = 33; prophylactic bilateral, *n* = 6; bilateral malignancy, *n* = 2; therapeutic mastectomy in one breast and prophylactic mastectomy of the other breast, *n* = 6. Implant: unilateral malignancy, *n* = 15; preventive bilateral, *n* = 20; bilateral malignancy, *n* = 1; therapeutic mastectomy in one breast and prophylactic mastectomy of the other breast, *n* = 9.

§If there was a malignancy in both breasts, the tumor was classified in a higher stage.

¶Of these, five women in the autologous group and nine in the implant group underwent primary reconstruction on one side, and on the other a secondary breast reconstruction. Two women received tissue expander first and subsequently underwent prophylactic mastectomy.

¶¶High education means (university of applied science and university) bachelor's degree and higher. Low education is all degrees and levels below bachelor's degree.

#When questionnaire was completed.

expectative, outpatient intervention, or clinical intervention).

Statistical Analysis

Descriptive statistics were applied to describe baseline characteristics, for which the patients were stratified according to their autologous or implant breast reconstruction. The BREAST-Q scores are presented as means and standard deviations. Differences between the two groups on the BREAST-Q and RAND-36 were tested with multiple regression analyses to adjust for bias by indication. Differences between the two groups on the Hospital Anxiety and Depression Scale and the Concerns About Recurrence Scale–Dutch Language Version were tested with multiple logistic regression analyses. In both analyses, a back-transforming method was applied to identify significant variables, as all the multiple models included the variable “autologous/implant.” A value of *p* < 0.05 was used to indicate significance. The complications were analyzed with the Mann-Whitney *U* test, and are presented by reconstruction technique. The statistical analyses were performed using SPSS Version 18.0 (SPSS, Inc., Chicago, Ill.).

RESULTS

The overall response rate was 72 percent (100 of 139). This cross-sectional study compared 47 women who underwent autologous breast reconstruction with 45 women who underwent implant breast reconstruction (Table 1).

Several significant differences were noted. The women with autologous breast reconstruction were significantly older than the women in the implant group (51 and 44 years, respectively). Furthermore, the autologous group underwent mastectomy and breast reconstruction at a significantly older age (45 and 42 years, respectively). In addition, women with an autologous breast reconstruction waited significantly longer (21 months) between the mastectomy and reconstruction than women with an implant breast reconstruction. Seventy-six percent of the implant group had bilateral breast reconstruction, and 58 percent of this group had a *BRCA1* or *BRCA2* gene mutation. In the autologous breast reconstruction group, more women had a high body mass index and more women in this group received radiotherapy. Autologous breast reconstructions were mainly unilateral and secondary reconstructions. Implant breast reconstructions were more primary and bilateral. Women who underwent implant breast reconstruction had higher education levels (50

percent) than women who underwent autologous breast reconstruction (26 percent).

BREAST-Q

The patients reported on their quality of life, measured with the BREAST-Q scores as shown in Table 2. After adjustment for significant differences between the two patient groups, patients who underwent autologous breast reconstruction scored significantly higher than patients who underwent implant breast reconstruction in the scale satisfaction with breasts ($p = 0.023$). In all other scales, there were no other significant differences between autologous and alloplastic breast reconstruction. None of the domains of the RAND-36, the Hospital Anxiety and Depression Scale, or the Concerns About Recurrence Scale–Dutch Language Version showed significant differences between autologous and implant breast reconstruction after adjustment for relevant variables (Table 3).

The complication revisions registration (Table 4) showed asymmetry in 54 percent of women following autologous reconstruction, whereas this was 11 percent in women with implant breast reconstruction (Table 5). In addition, more women with an autologous breast reconstruction [$n = 47$ (25 percent)] underwent secondary correction than women with implant breast reconstruction [$n = 45$ (12 percent)] ($p = 0.012$). There were no significant differences in complications between the two groups.

DISCUSSION

In this study, the BREAST-Q satisfaction with breasts module results showed that women who underwent autologous breast reconstruction were more satisfied with their breasts than women who underwent implant breast reconstruction ($p = 0.023$). Our data support previous studies.^{16,17} Alderman et al.¹⁸ concluded that women with a transverse rectus abdominis musculocutaneous flap breast reconstruction were in general more satisfied with their breast reconstruction than women with implants. Bresser et al.¹⁹ showed that almost half of the women with implants feel that the reconstructed breast is not their own. The fact that women with an implant breast reconstruction were less satisfied with their breasts might be associated with the high expectations of young women undergoing prophylactic mastectomy and direct implant reconstruction. In addition, 64 percent of the autologous group underwent secondary reconstruction; they might compare their reconstructed breast to the period after mastectomy.

Table 2. BREAST-Q Scores*

BREAST-Q Domain	Autologous	Implants
Satisfaction with breasts	75.19 (17.09)	65.51 (17.55)
Satisfaction with the outcomes	81.82 (18.69)	74.53 (18.98)
Psychosocial well-being	73.96 (17.80)	77.18 (18.10)
Sexual well-being	60.89 (20.82)	61.14 (24.17)
Physical well-being	77.13 (17.11)	71.89 (15.06)
Physical well-being: abdomen	77.35 (23.90)	—
Satisfaction with nipples	65.31 (27.82)	63.62 (33.99)

*Mean (SD) on a scale from 1 to 100.

We found no other differences in quality of life between autologous breast reconstruction and implant breast reconstruction. These results were also found in previous studies,^{16,18,20,21} although these studies did not use a condition-specific instrument such as the BREAST-Q.

Our study showed that more women with autologous breast reconstruction needed secondary correction than did women with implant breast reconstruction ($p = 0.012$). In women with autologous breast reconstruction, more asymmetry was observed than in women with implant breast reconstruction ($p = 0.003$). The fact that autologous breast reconstructions were mainly unilateral and secondary reconstructions might in part explain the need for secondary operations. Mlodinow et al. showed that autologous reconstruction patients experienced a higher rate of overall complications than those undergoing implant/expander reconstruction, in addition to higher rates of reoperation. This was mainly because perioperative complications included pedicle thrombosis and hematoma.²²

The patients in the autologous group were older and underwent mastectomy and breast reconstruction at a significantly older age than the implant breast reconstruction group. The younger age of the prophylactic mastectomy patients might also help to explain the above differences. Moreover, prophylactic mastectomy patients decided more for direct alloplastic breast reconstruction. In addition, breast reconstruction could be delayed for medical reasons after therapeutic mastectomy. In our study, the autologous breast reconstruction group spent significantly more time between the first mastectomy and the first reconstruction than did the alloplastic group. Previous studies showed that the time elapsed after surgery positively affected the quality of life in women with breast surgery.¹⁷ In our study, the longer period between mastectomy and breast reconstruction may have contributed to the higher satisfaction that we found in the autologous breast reconstruction group. However, the time interval between breast reconstruction and survey completion was almost the same for both groups (Table 1).

Table 3. Autologous versus Implant: Results of Multiple Linear Regression Analysis for BREAST-Q and RAND-36*

	Variables†	Beta	SE	<i>p</i>	95% CL for Beta	
					Lower	Upper
BQ1: Satisfaction with breasts	Nipple reconstruction	-8.16	3.52	0.023‡	-15.15	-1.18
BQ2: Satisfaction with the outcomes	Age at questionnaires completed; time between first mastectomy and first reconstruction; chemotherapy; education; nipple reconstruction	4.90	4.00	0.226	-3.09	12.89
BQ3: Psychosocial well-being	Nipple reconstruction	4.61	3.73	0.220	-2.80	12.01
BQ4: Sexual well-being	Unilateral or bilateral reconstruction; nipple reconstruction	6.44	5.03	0.204	-3.56	16.45
BQ5: Physical well-being: breast region	Unilateral or bilateral reconstruction	-2.60	3.61	0.473	-9.77	4.57
BQ7: Satisfaction with nipples	None	-1.70	7.92	0.831	-17.55	14.15
R1: Physical functioning	Comorbidity; BMI; nipple reconstruction	2.13	3.18	0.506	-4.20	8.46
R2: Social functioning	Comorbidity	-1.21	3.64	0.741	-8.44	6.02
R3: Physical role problem	Comorbidity; <i>BRCA</i> ; nipple reconstruction	5.41	7.58	0.477	-9.65	20.47
R4: Emotional role problem	None	-7.39	7.44	0.323	-22.17	7.38
R5: Mental health	Comorbidity; partner; complications	-2.05	2.30	0.467	-7.62	3.52
R6: Vitality	Comorbidity; smoking	0.88	3.78	0.817	-6.63	8.38
R7: Pain	BMI; smoking	2.40	3.91	0.541	-5.37	10.17
R8: General health	Comorbidity; smoking	4.61	3.67	0.212	-2.68	11.91
R9: Health change	<i>BRCA</i>	9.28	5.63	0.103	-1.90	20.46

CL, confidence limits; BMI, body mass index; TNM, tumor, node, metastasis.

*Coded as 0 for autologous and 1 for implant. Note that BQ6 can only be measured in the autologous group. Beta is the coefficient for main effect (mastectomy alone)/reconstruction in the model; SE is the standard error for beta.

†Variables are the variables included in the model except the main effect (autologous/alloplastic breast reconstruction); age at mastectomy, age at breast reconstruction, age when quality of life reported, time between mastectomy and breast reconstruction in months, time between breast reconstruction and reporting quality of life, mastectomy indication, TNM classification, comorbidity, BMI, BMI >30, smoking, radiotherapy, chemotherapy, unilateral or bilateral mastectomy, unilateral or bilateral breast reconstruction, *BRCA*, primary/secondary breast reconstruction, education level, partner, nipple reconstruction, areola reconstruction, complications (asymmetry, scar, seroma, ptosis, wound healing), and secondary corrections.

‡Significant.

Sixty-four percent of the autologous group underwent secondary breast reconstruction. This may have influenced the quality of life and satisfaction outcomes of this group. The study by Contant et al.²³ found that women who underwent primary breast reconstruction compared this breast with their natural breasts and were more critical than women with a secondary breast reconstruction. This suggests that women undergoing secondary reconstruction were more easily satisfied. Another study also showed that women with a secondary breast reconstruction were more satisfied with sexuality and femininity than women who

underwent primary breast reconstruction.²⁴ Roth et al.²⁵ concluded that women with primary breast reconstruction experienced more psychosocial and functional limitations than women with a secondary breast reconstruction. Our findings are in concordance with results suggesting that women with autologous breast reconstruction are more satisfied with their breast(s).

Boughton²⁶ showed that the psychological consequences of breast cancer surgery depend on the personality of the individual and not the type of surgery being performed. A study by Medina-Franco et al.²⁷ found that women with benign breast disease have better physical self-esteem than women with malignant disease. They suggest that the diagnosis of cancer has a greater impact on the patient's self-image than does the type of surgical procedure. However, this is not valid for prophylactic breast reconstruction patients. Damen et al.²⁸ showed that 90 percent of women with a breast reconstructed by means of a deep inferior epigastric perforator flap felt like it was their own breast. In a study by Drazan et al.,²⁹ the deep inferior epigastric perforator flap reconstruction is recommended in prophylactic bilateral mastectomy because in the long term it gives better tissue replacement than breast

Table 4. Classification of Complications per Reconstructive Group

	No.	Autologous (%)	Implant (%)	<i>p</i>
No. of patients in the subgroup		14 (29.2)	14 (31.1)	
Complication groups				
Temporary disadvantage expectative policy	3	1 (7.1)	2 (14.3)	1.000
Recovery after outpatient intervention	11	4 (28.6)	2 (14.3)	0.648
Recovery after clinical intervention	35	9 (64.3)	10 (71.4)	1.000

Table 5. Complication Revisions

	Autologous (%)	Implant (%)	<i>p</i>	Secondary Correction		
				Autologous (%)	Implant (%)	<i>p</i>
No. Complications	47	45				
Asymmetry	26 (54.2)	11 (24.4)	0.003*	22 (84.6)	8 (72.7)	0.403
Excess skin	7 (14.6)	5 (11.1)	0.618	7 (100)	4 (80.0)	0.417
Ugly scar	3 (6.3)	0		3 (100)	0	

*Statistically significant.

reconstruction with implants. This might explain our findings that women with autologous breast reconstruction were more satisfied with their breasts than women with an implant.

Drawbacks of this study include its retrospective nature. In addition, neither patients nor the surgical reconstruction methods were randomized. The choice of a breast reconstruction depends on patient preference, indication, availability of reconstructive options, and the preference of the surgeon. However, even in a prospective study, randomization of patients might not be ethically acceptable, suggesting that our study design is the best available option. Also, the study analyses were controlled for bias.

We were interested in investigating satisfaction with unilateral and bilateral breast reconstruction. However, the sample size was too small to stratify the BREAST-Q by laterality. We excluded women with prosthesis or flap failure. This might be considered as a drawback, but in our opinion, their quality of life is likely to represent features of a different process compared with patients with a successful breast reconstruction. We did not distinguish between unilateral and bilateral breast reconstruction within the breast reconstruction groups. Yueh et al.¹⁶ state that a unilateral or bilateral breast reconstruction may play a role in the outcome of satisfaction. Psychosocial well-being, sexual well-being, physical well-being, nipples, satisfaction with care, and satisfaction with the outcome of the entire breast procedure were not significantly different between the autologous and implant groups. Most likely, our study population was too small for significant results to be detected, and we consider this study a pilot, to prepare for conducting a larger, prospective study.

CONCLUSIONS

Women with a successful breast reconstruction are generally satisfied and have a good quality of life. This study investigated which breast reconstruction method is associated with better outcomes according to the patients. Autologous

breast reconstruction gives more satisfaction than implant breast reconstruction. Between the autologous and implant techniques, we found no differences in quality of life. The findings of this study may inform the professional guidance for breast reconstruction. This may help patients and medical teams in making informed decisions for breast reconstruction. To strengthen the evidence regarding satisfaction with the entire breast procedure, it is necessary to perform prospective studies with larger and homogeneous groups.

Yassir Eltahir, M.D.

Department of Plastic Surgery
University Medical Center Groningen
Hanzeplein 1, BB81
9700 RB Groningen, The Netherlands
y.eltahir@umcg.nl

REFERENCES

1. Brennan ME, Spillane AJ. Uptake and predictors of post-mastectomy reconstruction in women with breast malignancy: Systematic review. *Eur J Surg Oncol*. 2013;39:527–541.
2. Reefy S, Patani N, Anderson A, Burgoyne G, Osman H, Mokbel K. Oncological outcome and patient satisfaction with skin-sparing mastectomy and immediate breast reconstruction: A prospective observational study. *BMC Cancer* 2010;10:171.
3. Fischer JP, Nelson JA, Cleveland E, et al. Breast reconstruction modality outcome study: A comparison of expander/implants and free flaps in select patients. *Plast Reconstr Surg*. 2013;131:928–934.
4. Ohkuma R, Lacayo B, Rad AN, et al. Health related quality of life after breast reconstructive surgery: An interim analysis. *Plast Reconstr Surg*. 2013;131:84.
5. Cordeiro PG, McCarthy CM. A single surgeon's 12-year experience with tissue expander/implant breast reconstruction: Part II. An analysis of long-term complications, aesthetic outcomes, and patient satisfaction. *Plast Reconstr Surg*. 2006;118:832–839.
6. Hu ES, Pusic AL, Waljee JF, et al. Patient-reported aesthetic satisfaction with breast reconstruction during the long-term survivorship period. *Plast Reconstr Surg*. 2009;124:1–8.
7. Winters ZE, Benson JR, Pusic AL. A systematic review of the clinical evidence to guide treatment recommendations in breast reconstruction based on patient-reported outcome measures and health-related quality of life. *Ann Surg*. 2010;252:929–942.
8. Pusic AL, Klassen AF, Scott AM, Klok JA, Cordeiro PG, Cano SJ. Development of a new patient-reported outcome measure for breast surgery: The BREAST-Q. *Plast Reconstr Surg*. 2009;124:345–353.

9. Pusic AL, Chen CM, Cano S, et al. Measuring quality of life in cosmetic and reconstructive breast surgery: A systematic review of patient-reported outcomes instruments. *Plast Reconstr Surg*. 2007;120:823–837; discussion 838–839.
10. Cano SJ, Klassen AF, Scott AM, Pusic AL. A closer look at the Breast-Q. *Clin Plast Surg*. 2013;40:287–296.
11. van der Zee KI, Sanderman R, van Sonderen FLP. *Het meten van de algemene gezondheidstoestand met de RAND-36: een handleiding*. Groningen, The Netherlands: Noordelijk Centrum voor Gezondheidsvraagstukken; 1993.
12. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *J Psychosom Res*. 2002;52:69–77.
13. Spinhoven P, Ormel J, Sloekers PP, Kempen GI, Speckens AE, Van Hemert AM. A validation study of the Hospital Anxiety and Depression Scale (HADS) in different groups of Dutch subjects. *Psychol Med*. 1997;27:363–370.
14. Vickberg SM. The Concerns About Recurrence Scale (CARS): A systematic measure of women's fears about the possibility of breast cancer recurrence. *Ann Behav Med*. 2003;25:16–24.
15. van den Beuken-van Everdingen MH, Peters ML, de Rijke JM, Schouten HC, van Kleef M, Patijn J. Concerns of former breast cancer patients about disease recurrence: A validation and prevalence study. *Psychooncology* 2008;17:1137–1145.
16. Yueh JH, Slavin SA, Adesiyun T, et al. Patient satisfaction in postmastectomy breast reconstruction: A comparative evaluation of DIEP, TRAM, latissimus flap, and implant techniques. *Plast Reconstr Surg*. 2010;125:1585–1595.
17. Tønseth KA, Hokland BM, Tindholdt TT, Abyholm FE, Stavem K. Quality of life, patient satisfaction and cosmetic outcome after breast reconstruction using DIEP flap or expandable breast implant. *J Plast Reconstr Aesthet Surg*. 2008;61:1188–1194.
18. Alderman AK, Wilkins EG, Lowery JC, Kim M, Davis JA. Determinants of patient satisfaction in postmastectomy breast reconstruction. *Plast Reconstr Surg*. 2000;106:769–776.
19. Bresser PJ, Seynaeve C, Van Gool AR, et al. Satisfaction with prophylactic mastectomy and breast reconstruction in genetically predisposed women. *Plast Reconstr Surg*. 2006;117:1675–1682; discussion 1683–1684.
20. Tønseth KA, Hokland BM, Tindholdt TT, Abyholm FE, Stavem K. Quality of life, patient satisfaction and cosmetic outcome after breast reconstruction using DIEP flap or expandable breast implant. *J Plast Reconstr Aesthet Surg*. 2008;61:1188–1194.
21. Papadopoulos NA, Kovacs L, Baumann A, et al. Quality of life and patient satisfaction after breast reconstruction. *Chirurg* 2006;77:610–615.
22. Mlodinow AS, Ver Halen JP, Lim S, Nguyen KT, Gaido JA, Kim JY. Predictors of admission after breast reconstruction: A multi-institutional analysis of 5012 patients. *Ann Plast Surg*. 2011;71:335–341.
23. Tønseth KA, Hokland BM, Tindholdt TT, Abyholm FE, Stavem K. Quality of life, patient satisfaction and cosmetic outcome after breast reconstruction using DIEP flap or expandable breast implant. *J Plast Reconstr Aesthet Surg*. 2008;61:1188–1194.
24. Contant CM, van Wersch AM, Wiggers T, Wai RT, van Geel AN. Motivations, satisfaction, and information of immediate breast reconstruction following mastectomy. *Patient Educ Couns*. 2000;40:201–208.
25. Rowland JH, Desmond KA, Meyerowitz BE, Belin TR, Wyatt GE, Ganz PA. Role of breast reconstructive surgery in physical and emotional outcomes among breast cancer survivors. *J Natl Cancer Inst*. 2000;92:1422–1429.
26. Roth RS, Lowery JC, Davis J, Wilkins EG. Quality of life and affective distress in women seeking immediate versus delayed breast reconstruction after mastectomy for breast cancer. *Plast Reconstr Surg*. 2005;116:993–1002; discussion 1003–1005.
27. Boughton B. Emotional outcome after breast surgery is highly individual. *J Natl Cancer Inst*. 2000;92:1375–1376.
28. Medina-Franco H, García-Alvarez MN, Rojas-García P, Trabanino C, Drucker-Zertuche M, Arcila D. Body image perception and quality of life in patients who underwent breast surgery. *Am Surg*. 2010;76:1000–1005.
29. Damen TH, Timman R, Kunst EH, et al. High satisfaction rates in women after DIEP flap breast reconstruction. *J Plast Reconstr Aesthet Surg*. 2010;63:93–100.
30. Drazan L, Vesely J, Hyza P, et al. Bilateral breast reconstruction with DIEP flaps: 4 years' experience. *J Plast Reconstr Aesthet Surg*. 2008;61:1309–1315.