

Patient Perspectives and Quality of Life after Breast Reconstruction and the Impact of Subsequent Revisions

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Background: There is limited research on the impact of revisional surgery after breast reconstruction on patient experience and postoperative quality of life (QoL).

Methods: Patients undergoing mastectomy with immediate implant-based or autologous free-flap breast reconstruction from 2008 to 2020 were reviewed. These patients were categorized by revisions (0–1, 2–3, and 4+) and surveyed on QoL metrics using BREAST-Q and Was It Worth It? (WIWI) questionnaires. BREAST-Q QoL, satisfaction, and WIWI metrics between revision groups were evaluated.

Results: Among 252 patients, a total of 150 patients (60%) underwent zero to one revisions, 72 patients (28%) underwent two to three revisions, and 30 patients (12%) underwent four or more revisions. Median follow-up was 6 years (range, 1–11 years). BREAST-Q satisfaction among patients with four or more revisions was significantly lower ($P = 0.03$), while core QoL domains (chest physical, psychosocial, and sexual well-being) did not significantly differ. Analysis of unplanned reoperations due to complications and breast satisfaction showed no significant difference in QoL scores between groups ($P = 0.08$). Regarding WIWI QoL metrics, four or more revisions were associated with a higher rate of worse QoL ($P = 0.035$) and worse overall experience ($P = 0.001$). Most patients in all revision groups felt it was worthwhile to undergo breast reconstruction (86%), would choose breast reconstruction again (83%), and would recommend breast reconstruction to others (79%).

Conclusions: Overall, a majority of patients undergoing revisions after breast reconstruction still have a worthwhile experience. Although reoperations after breast reconstruction do not significantly impact long-term BREAST-Q QoL domains, patients undergoing four or more revisions have significantly lower breast satisfaction, worse QoL, and a postoperative experience worse than expected. (*Plast Reconstr Surg Glob Open* 2023; 11:e4885; doi: [10.1097/GOX.0000000000004885](https://doi.org/10.1097/GOX.0000000000004885); Published online 12 June 2023.)

INTRODUCTION

Multidisciplinary care has led to an increase in breast cancer survival rates,¹ with plastic and reconstructive surgeons serving an integral role in this collaborative team.

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With increasing proportions of women opting for mastectomy over breast-conserving therapy in recent years,² plastic surgeons are prepared to offer various avenues of breast reconstruction as part of the oncoplastic approach to breast cancer treatment. Indeed, the United States has seen a parallel increase in the number of patients undergoing both autologous and implant-based breast reconstruction; healthcare-related quality-of-life (QoL) outcomes after breast reconstruction have demonstrated significant benefits to patient well-being when compared to mastectomy alone.^{3–8}

Emerging data illustrates high complication and revision rates following index breast reconstruction.^{9–11} Currently available literature fails to assess the potential impact of subsequent surgical revisions on patient QoL. Although breast reconstruction after cancer has improved QoL in countless women, the physical, psychosocial, and

Disclosure statements are at the end of this article, following the correspondence information.

sexual benefit of undergoing such a procedure has the potential to be overshadowed by complications and the need for unplanned surgery. With revision rates exceeding 50% in some groups undergoing reconstruction, the impact of need for reoperation on patient QoL metrics warrants further exploration.^{9,10}

This study aimed to investigate the impact of subsequent revisions on patient-reported QoL domains after index breast reconstruction, using the previously validated BREAST-Q questionnaire and Was it Worth It? (WIWI) QoL metrics. We hypothesize that patients who receive a higher number of revisional procedures will have lower QoL across all domains.

METHODS

Patient Factors

Review of a prospectively maintained institutional breast cancer database was conducted for all patients undergoing nipple-sparing, skin-sparing, or simple mastectomy with immediate implant-based or autologous free-flap breast reconstruction from 2008 to 2020. Implant-based techniques included direct-to-implant and tissue expander reconstruction. Autologous tissue reconstruction included free muscle-sparing transverse rectus abdominis myocutaneous flap and deep inferior epigastric perforator flap reconstruction. Patients undergoing delayed breast reconstruction after mastectomy were excluded. Institutional practice for implant-based breast reconstruction selectively utilized fat grafting during the index reconstruction based on the discretion of the operating surgeon; patients undergoing autologous breast reconstruction underwent immediate reconstruction at the time of mastectomy without the use of tissue expanders or implants.

Following index breast reconstruction, all subsequent revisions were reviewed and quantified for each patient. This included planned reoperations (ie, tissue expander exchange to permanent prosthesis), cosmetic revisions (ie, fat grafting, skin or nipple revisions, and scar revisions), and unplanned reoperations due to complications (ie, hematoma, flap necrosis, wound breakdown, surgical site infection, persistent seroma, or capsular contracture).

Survey Distribution

All patients were selected for survey distribution by simple random sampling. These patients were mailed a survey with BREAST-Q and WIWI QoL metrics.¹² All patients were sent a printed survey by mail, then contacted by phone regarding the recent mailing of the survey to confirm receiving it. Once patient contact was made by mail or by phone, written informed consent was obtained, and patients were given the option to fill out the survey and return it by prepurchased postage or conduct the survey over the phone. Two attempts at contact were made for each patient, and patients were classified as nonresponders if no contacts were established within 6 months of the first contact attempt. Survey materials were prepared, pretested, distributed, administered, and collected by the Mayo Clinic Survey Research Center.

Takeaways

Question: What is the impact of subsequent revisions on patient-reported quality of life (QoL) after mastectomy with immediate breast reconstruction?

Findings: Analysis of revision cohorts and BREAST-Q/Was It Worth It questionnaires revealed that four or more revisions led to a worse experience and decreased QoL. Despite this finding, most patients getting revisions felt it was still worthwhile to undergo breast reconstruction, would choose reconstruction again, and would recommend it to others.

Meaning: Revisions after breast reconstruction appear to significantly impact patient satisfaction and QoL after four or more revisions.

Quality-of-Life Analysis

The impact of subsequent reoperations on QoL was assessed by placing patients into three categorical groups based on the number of procedures they received (0–1, 2–3, and 4+). Primary end points included the three core QoL BREAST-Q metrics (chest physical, psychosocial, and sexual well-being). To further evaluate the impact of patient perspectives and their association with revisions, secondary end points included BREAST-Q reported satisfaction with breasts and WIWI QoL metrics. Comparison of BREAST-Q and WIWI metrics between categorical revision groups was performed using the analysis of variance F-test and chi-squared tests. An ad hoc analysis was also performed assessing the impact of unplanned reoperations due to either complications or cosmetic revisions on patient QoL metrics. All analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, N.C.). Two-tailed tests were used. An alpha level of 0.05 was considered statistically significant.

This study was performed after institutional review board review and conducted in accordance with Enhancing the Quality and Transparency Of Health Research (EQUATOR) network guidelines for survey studies dictated by Kelley et al.¹³ as well as Consensus-Based Checklist for Reporting of Survey Study guidelines.^{13,14}

RESULTS

A total of 568 patients were identified who underwent mastectomy with breast reconstruction from 2008 to 2020. Overall, 252 total patients responded to the survey, yielding a response rate of 44%. Median time from date of surgery to survey completion was 6 years (range, 1–11 y). All patients had a minimum of 1 year of follow-up.

Survey respondents had mean age of 53 years (range, 22–78 y) and a mean BMI of 25.0 (range 15.6–39.9). Patient race/ethnicities included White (231, 91.6%), African American (3, 1.2%), Hispanic (8, 3.2%), Asian/Pacific Islander (8, 3.2%), Native American (1, 0.4%), or undisclosed ethnicity (1, 0.4%). Patients were treated for ductal carcinoma in-situ (50, 20%), high-risk genetic factors for breast cancer development (19, 8%), and invasive cancer (183, 72%), with 62 breast cancer patients (62/169, 37%) receiving adjuvant chemotherapy and 47

Table 1. Comparative Analysis of Patient Factors and Surgical Techniques between Revision Groups

Patient Factors and Procedures	Total Revisions, N (%)			P
	0–1, N = 150	2–3, N = 72	4+, N = 30	
Age				
Mean ± SD (range)	53 ± 11.1 (22–77)	52 ± 10.5 (29–78)	53 ± 8.6 (39–71)	0.58*
BMI				
Mean ± SD (range)	24.8 ± 4.5 (17.3–39.9)	25.2 ± 4.9 (15.6–37.8)	25.4 ± 4.6 (16.6–37.1)	0.76*
Ethnicity				
White	134 (89.3)	70 (97.2)	27 (90)	0.18†
African American	3 (2)	0 (0)	3 (1.2)	
Hispanic	5 (3.3)	2 (2.8)	8 (3.2)	
Asian/Pacific Islander	7 (4.7)	0 (0)	8 (3.2)	
Native American	0 (0)	0 (0)	1 (0.4)	
Undisclosed	1 (0.7)	0 (0)	1 (0.4)	
Active smoking	4 (2.7)	1 (1.4)	3 (10)	0.07†
Diabetes	2 (1.3)	1 (1.4)	1 (3.3)	0.72†
Treatment indication				
Prophylactic	14 (9)	3 (4)	2 (7)	0.56†
DCIS	30 (20)	15 (21)	5 (17)	
Invasive cancer	106 (71)	54 (75)	23 (76)	
Adjuvant therapies				
Chemotherapy	30 (20)	25 (35)	7 (23)	0.06†
Radiation therapy	26 (17)	16 (22)	5 (17)	0.65†
Reconstruction technique				
Direct to implant	117 (78)	30 (42)	12 (40)	<0.001†
Tissue expander	19 (13)	27 (37)	12 (40)	
Autologous tissue	14 (9)	15 (21)	6 (20)	
Implant placement				
Subpectoral	94 (63)	50 (69)	23 (76)	0.001†
Subcutaneous	42 (28)	7 (10)	1 (3)	

*ANOVA F-test *P* value.†Chi-square *P* value.

ANOVA, analysis of variance; DCIS, ductal carcinoma in-situ.

breast cancer patients (47/169, 28%) undergoing adjuvant radiation therapy. For pertinent comorbidities, our cohort contained total of eight patients with active smoking and four patients with type 2 diabetes. Regarding surgical techniques, the majority of respondents underwent bilateral procedures (178, 71%). Reconstruction techniques included direct-to-implant (159, 63%) and tissue expander (58, 23%) reconstruction utilizing implant placement in either the prepectoral (50, 23%) or subpectoral (167, 77%) position. Autologous free-flap techniques included deep inferior epigastric perforator (26, 10%) or muscle-sparing transverse rectus abdominis myocutaneous (9, 4%) flaps.

Evaluation of revisions showed that a total of 150 patients (60%) underwent zero to one revisions, whereas 72 patients (28%) underwent two to three revisions, and 30 patients (12%) underwent four or more revisions. The type of reconstruction (direct-to-implant, tissue expander,

and autologous free-flap) and implant placement (subpectoral and subcutaneous) significantly differed between patients undergoing zero to one, two to three, and four or more revisions. Comparative analysis between revision groups showed no significant differences in patient age, BMI, ethnicity, smoking status, diabetes, cancer stage, or adjuvant therapies (Table 1).

On analysis of BREAST-Q QoL metrics between revision groups (Table 2), chest physical, psychosocial, and sexual well-being did not significantly differ. Revision groups only differed in breast satisfaction (Table 3), with BREAST-Q scores significantly declining among patients with four or more revisions (*P* = 0.03).

Ad hoc analysis of unplanned reoperations due to complications and QoL showed no significant difference in breast satisfaction scores between groups (*P* = 0.078); although unplanned reoperations due to complications showed no significant difference in QoL scores between

Table 2. Analysis of BREAST-Q Metrics between Revision Groups

BREAST-Q Metrics (Mean ± SD, Range)	Total Revisions			P
	0–1, N = 150	2–3, N = 72	4+ N = 30	
Chest physical well-being	81.4 ± 19.6 (0–100)	78.4 ± 20.2 (0–100)	73.7 ± 26.0 (20–100)	0.151*
Psychosocial well-being	79.7 ± 19.0 (24–100)	76.9 ± 19.4 (34–100)	73.9 ± 22.0 (21–100)	0.259*
Sexual well-being	58.2 ± 22.8 (0–100)	55.1 ± 23.2 (0–100)	47.2 ± 24.9 (0–100)	0.062*

*ANOVA F-test *P* value.

Table 3. Analysis of BREAST-Q Satisfaction between Revision Groups, Ad-hoc Analysis of Unplanned Reoperations Due to Complications and Breast Satisfaction

BREAST-Q Satisfaction and Total Revisions (Mean ± SD, Range)	Total Revisions			P
	0–1, N = 150	2–3, N = 72	4+, N = 30	
Satisfaction with breasts	64.5 ± 19.7 (0–100)	63.1 ± 19.4 (21–100)	53.1 ± 22.2 (0–92)	0.031*
BREAST-Q Satisfaction and Unplanned Reoperations Due to Complications (Mean ± SD, Range)	Total Unplanned Reoperations			P
	0–1, N = 185	2–3, N = 50	4+, N = 17	
Satisfaction with breasts	64.5 ± 19.6 (0–100)	58.2 ± 21.0 (0–100)	55.8 ± 21.1 (0–92)	0.078*

*ANOVA F-test P value.

groups, unfortunately due to a limited survey response rate, only 12 survey respondents were available for formal analysis of QoL after two to three and four or more cosmetic revisions, precluding our ability to formally analyze the impact of cosmetic revisions on QoL metrics.

Regarding WIWI QoL metrics (Table 4), most patients in all revision groups felt that it was worthwhile to undergo breast reconstruction (N = 217/252, 86%), would choose breast reconstruction again (N = 208/252, 83%), and recommend breast reconstruction to others (N = 200/252, 79%). The majority of patients within all revision groups reported that their QoL stayed the same after breast reconstruction (N = 154/252, 61%), with significantly more patients who underwent four or more revisions reporting their QoL got worse (P = 0.035). Overall experience also significantly differed, with 46% of patients receiving four or more revisions reporting that their experience following breast reconstruction was worse than expected (P = 0.001).

DISCUSSION

Developed in 2009, the BREAST-Q questionnaire has been highly utilized to assess healthcare-related QoL and

patient satisfaction as it pertains to breast reconstruction.¹² Although the safety, aesthetic outcomes, and QoL with postmastectomy breast reconstruction are well described in the literature, a study evaluating the patient experience following reoperations and the influence of these interventions on QoL has not been thoroughly conducted.^{6,15–17} With multiple studies demonstrating a clear benefit for implant-based and autologous breast reconstruction and improved QoL in breast cancer patients, high rates of revisions among these patients have the potential to negatively impact patients.^{6,9,10,15} Available data described by Rosson et al¹⁸ describe that QoL significantly differs among patients pursuing major revisions; unfortunately, this study only evaluated 32 such patients. Our results, drawn from long-term results in a large cohort of patients undergoing revisionary surgery, show that despite the need to undergo reoperation after breast reconstruction, majority of patients pursuing breast reconstruction report it is overall a worthwhile experience and would still recommend it to others. Furthermore, quantitative analysis of subsequent revisions appears to show no effect on physical, psychosocial, or sexual well-being, the three BREAST-Q QoL metrics.

Table 4. Analysis of WIWI Patient-reported QoL Metrics and Total Revisions

WIWI Metrics	Total Revisions			P
	0–1, N = 150 (N, %)	2–3, N = 72 (N, %)	4+, N = 30 (N, %)	
Was it worthwhile to undergo breast reconstruction?				
Yes	131 (87)	63 (88)	23 (77)	0.294*
No	6 (4)	3 (4)	4 (13)	
Uncertain	13 (9)	6 (8)	3 (10)	
Would you choose breast reconstruction again?				
Yes	128 (85.3)	57 (79)	23 (77)	0.416*
No	11 (7.3)	7 (10)	4 (13)	
Uncertain	11 (7.3)	8 (11)	3 (10)	
Would you recommend breast reconstruction to others?				
Yes	126 (84)	54 (75)	20 (67)	0.244*
No	8 (5)	4 (6)	3 (10)	
Uncertain	16 (11)	14 (19)	7 (23)	
QoL change				
It improved	37 (25)	23 (32)	6 (20)	0.035*
It stayed the same	100 (67)	38 (53)	16 (53)	
It got worse	13 (8)	11 (15)	8 (27)	
Overall experience following breast reconstruction				
Better than I expected	70 (47)	23 (32)	8 (27)	0.001*
Same as I expected	57 (38)	28 (39)	8 (27)	
Worse than I expected	23 (15)	21 (29)	14 (46)	

*Chi-square P value.

Although our results outline that subsequent revisions carry no significant impact on QoL, the association between breast satisfaction and QoL is a relationship requiring further investigation. BREAST-Q satisfaction domains measure a patient's body image, covering general breast appearance (eg, size, symmetry, softness, implant placement, and cleavage), satisfaction with how a bra fits, and perception of how the breasts look when clothed or unclothed.¹⁹ There are also items specific to implants (eg, rippling) and postoperative issues (eg, scars). Specifically, within the satisfaction with breasts metric, we found that patients undergoing four or more revisions reported a significantly lower satisfaction when compared across groups. Our analysis sought to determine whether patients undergoing four or more revisions were largely unsatisfied with their breasts at baseline, thereby seeking more procedures, or the converse, whether four or more revisions leads to lower breast satisfaction. Results from our ad hoc satisfaction analysis of unplanned reoperations, which demonstrated that satisfaction with breasts did not significantly differ between unplanned revision groups, favor the notion that patients unsatisfied with breasts at baseline are more likely to pursue additional revisions. Unfortunately, due to a limited response rate among patients undergoing cosmetic revisions, the impact of purely cosmetic revisions on patient QoL could not be performed. Patient perception of body image is complex, and satisfaction with breasts is also multifactorial. Our results highlight the need for more research in this area to further evaluate confounding factors present in this finding.

A rarely utilized, but arguably of similar importance to BREAST-Q, is the WIWI survey. Developed in 2011 by Sloan et al.²⁰ This semistructured, qualitative survey assesses patient experiences with and recommendations regarding a specific area of interest. Although originally designed for patient attitudes toward oncologic clinical trial experiences, application of the WIWI survey in combination with responses from BREAST-Q provides valuable insight into attitudes regarding breast reconstruction. Although the four or more revisions group expressed a worse than expected experience within this specific metric on the WIWI survey, most patients in all revision groups reported a worthwhile experience, would choose breast reconstruction again, and would recommend breast reconstruction to others. Our results demonstrate that despite the negative impact of subsequent reoperations on QoL change and the overall postoperative experience, patients generally report overwhelmingly positive attitudes toward breast reconstruction.

There are several limitations to this study. First, a preoperative BREAST-Q questionnaire was not distributed to patients; these results would have been useful, particularly to establish a baseline for postoperative QoL metrics, or trend them over time, as current literature shows that patient satisfaction on aesthetic outcomes changes over time.²¹ Second, this study was potentially subjected to recall bias as the response to the questionnaire ranged from less than 1 year to 11 years after their index reconstruction. Furthermore, due to a limited response rate among patients undergoing revisions for cosmetic reasons,

formal analysis evaluating the impact of cosmetic revisions on QoL could not be performed; we hope to continue gathering these data for publication in future studies. Finally, as this is the first study to utilize the WIWI survey after breast reconstruction, even though it is a validated questionnaire utilized in other fields, the generalizability of WIWI among patients pursuing breast reconstruction remains to be determined until more studies utilize it to outline QoL outcomes among breast cancer patients pursuing reconstruction.

CONCLUSIONS

Revisional surgery following immediate implant-based or autologous breast reconstruction appears to significantly affect patient satisfaction and QoL after four or more revisions. Despite the negative impact of subsequent revisions on these metrics, patients undergoing additional procedures continue to recommend breast reconstruction and feel it is a worthwhile experience. These results are vital for patient education among breast cancer providers, helping to further inform patients regarding expectations, the potential for subsequent procedures, and the impact of these procedures on patient experience and long-term QoL after breast reconstruction.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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