



Turning failure into form: autologous solution to salvage a severely compromised breast following partial mastectomy and radiation - a case report

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Abstract

The objective of this report was to present the successful management of a severely compromised breast following multiple implant failures, wound-healing complications, and infections. A 40-year-old female patient presented to our center with a severely compromised breast after treatment for breast cancer. Clinical examination revealed marked volume deficiency of the left breast, resulting in pronounced breast asymmetry compared with the right breast, following multiple infections and prior interventions. Our therapeutic approach was to reconstruct the breast using an muscle-sparing type II transverse rectus abdominis myocutaneous (MS-2 TRAM) flap followed by refinement with lipofilling. The reconstructed breast showed a stable and aesthetically satisfactory outcome, objectively documented during the 25-month follow-up using VECTRA 3D imaging and patient-reported outcome measures. This case demonstrates the potential of autologous tissue for breast reconstruction and may aid preoperative decision-making in complex reconstructive scenarios.

INTRODUCTION

Approximately one in eight women in Germany will develop breast cancer during their lifetime^[1]. When oncologically indicated, breast-conserving therapy is the standard surgical procedure^[2]. However, breast-conserving therapy may result in postoperative volume deficits and contour irregularities, which can lead to significant breast asymmetry and negatively affect quality of life and body image^[3]. Implant-based and autologous procedures are available for breast reconstruction, with autologous abdominal free flaps often preferred in irradiated tissue^[2]. The former approach has been associated with higher complication rates, particularly in irradiated tissue, including infection rates of up to 10.7% and revision rates of up to 57.7%^[4-6].



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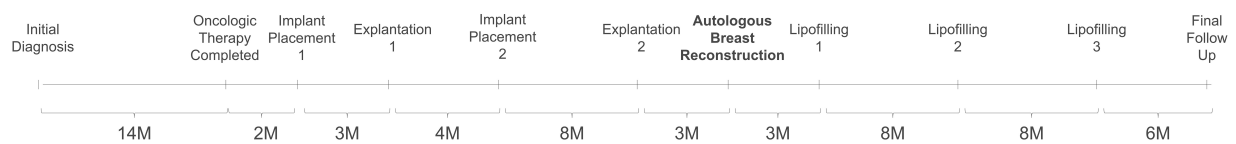


Figure 1. Timeline of the patient's treatment course from initial diagnosis to final follow-up.

This case report describes the management of a severely compromised breast following breast-conserving therapy and repeated implant-based reconstruction failures using autologous tissue reconstruction.

MAIN TEXT

Patient information

We report the case of a 40-year-old woman who presented with an aesthetically unsatisfactory breast appearance following treatment for breast carcinoma of the left breast. In addition to pain, the patient reported substantial impairment of superficial sensation of the affected breast, functional impairment, and considerable psychosocial reduction in quality of life. The primary tumor was a tubulolobular carcinoma (pT2, pN0, M0, G2, ER 100%, PR 95%, HER2-negative, Ki-67 30%). Treatment included neoadjuvant chemotherapy (12 cycles of nab-paclitaxel followed by four cycles of epirubicin and cyclophosphamide), breast-conserving therapy with two re-excisions, adjuvant chemotherapy (11 cycles of paclitaxel), radiotherapy, and endocrine therapy (tamoxifen). Preoperative and postoperative interventions are summarized in a timeline [Figure 1]. After completion of radiotherapy (30 Gy), a left-sided epieptoral implant was placed to address the volume deficiency resulting from the previous interventions. At the patient's request, a contralateral implant was inserted simultaneously to achieve symmetry between the breasts. On the left side, the initial 360 cc implant was removed three months after implantation due to wound-healing complications. Reimplantation with a 360-cc implant subsequently failed because of recurrent infections after 7 and 8 months, necessitating definitive explantation.

At presentation to our center, the patient's height was 1.65 m with a body weight of 70 kg [body mass index (BMI) 25.7 kg/m²]. No relevant comorbidities were reported; Sapporo criteria were negative. She had a 20 pack-year smoking history. Family history was positive for breast cancer; no genetic predisposition was identified. Apart from a prior cesarean section, there were no additional abdominal surgeries. The patient's only regular medication was adjuvant endocrine therapy with tamoxifen.

Clinical findings

Four weeks after explantation of the left implant, the patient presented to our department. Clinical examination revealed an unremarkable right breast, whereas the left breast exhibited loss of the medial and lateral lower pole, pronounced scar adhesions at the thoracic wall, and an inverted nipple-areola complex. There were no signs of active infection. Overall, the diagnosis of a secondary breast and nipple-areola complex deformity following recurrent wound healing disorders and infections after alloplastic augmentation was established [Figure 2]. Clinical photographs from the period before implant-based reconstruction were not available.

Preoperative volumetric analysis revealed a pronounced volume deficiency of the left breast, with a volume of 179.7 cc compared with 654.3 cc on the right (Δ 474.6 cc). Anthropometry confirmed breast asymmetry, with both the sternal notch-to-nipple and nipple-to-inframammary fold distances greater on the right side (differences of 4.5 and 8.3 cm). All measurements and photographic documentation were obtained using the VECTRA System (Canfield Scientific, NJ, USA). [Table 1 and Figure 2].



Figure 2. We present examples of three-dimensional photographic documentation at different time points. (A) Preoperative; (B) 2 weeks postoperative; (C) 25 months postoperative.

Table 1. VECTRA-derived volumetric and anthropometric breast measurements during follow-up

Volume (cc)	Preoperative	2 weeks	9 months	25 months
Left breast	179.7	748.8	767.0	764.5
Right breast	654.3	637.6	632.8	644.8
Δ R-L	474.6	-111.2	-134.2	-119.6
Breast anthropometry (cm)				
Sternal notch-to-nipple (Δ R-L)	4.5	1.9	1.0	1.6
Nipple-to-inframammary fold (Δ R-L)	8.3	-1.4	-0.3	-0.8
Nipple-to-nipple	19.2	19.3	20.6	20.6
Breast width (Δ R-L)	-0.4	-0.5	-2.9	-2.1
Breast projection (Δ R-L)	3.2	1.2	1.0	1.9

Δ : Difference; cc: cubic centimeters, cm: centimeters; R-L: right-left.

Table 2. BREAST-Q patient-reported outcome scores during follow-up

Quality of life scales	Preoperative	1 weeks	6 weeks	6 months	25 months
Satisfaction with breast	0	64	59	58	78
Physical well-being with chest	50	100	100	92	100
Sexual well-being	0	34	43	48	70
Psychosocial well-being	0	45	52	55	82
Physical well-being with abdomen	46	62	66	81	100
Satisfaction with abdomen	1/4	4/12	3/12	3/12	12/12

BREAST-Q scores range from 0 to 100, with higher scores indicating better patient-reported outcomes. “Satisfaction with abdomen” items are reported as stand-alone measures, with a maximum raw score of 4 preoperatively and 12 postoperatively, as the preoperative module includes one item and the postoperative module three items (maximum 4 points per item).

Additionally, the validated BREAST-Q questionnaire was administered pre- and postoperatively [Table 2]. Responses were converted into domain scores ranging from 0 to 100 according to the developer’s guidelines, with higher scores indicating better outcomes. “Satisfaction with abdomen” items were analyzed as stand-alone measures. Preoperative assessment revealed low scores, particularly in “Satisfaction with breast” (0) and “Psychosocial well-being” (0).

Diagnostic assessment

Sonographic examination demonstrated a seroma in the left breast with no residual breast glandular tissue, while the right breast showed an intact implant. Preoperative contrast-enhanced axial computed tomography angiography demonstrated adequate subcutaneous abdominal fat thickness (28.3 mm), enabled perforator mapping of the deep inferior epigastric vessels, and confirmed normal internal mammary vessel anatomy without anatomical variations. Laboratory testing showed no evidence of infection and no abnormalities in coagulation parameters.

Therapeutic intervention

Following the previously performed external procedures, approximately 100 g of residual breast tissue remained on the left side. After interdisciplinary gynecological evaluation at our center, no further gynecological surgical intervention was indicated. After shared decision-making, the patient expressed a clear preference for autologous reconstruction and declined further implant-based procedures. The abdomen was considered the most suitable donor site, as it provided sufficient skin and soft tissue to restore the required breast volume while simultaneously replacing the deficient skin envelope [Figure 3]. Immediate smoking cessation was implemented preoperatively.

Preoperatively, the patient was marked in both supine and standing positions; the planned flap dimensions measured 14 cm × 46 cm. The procedure was performed by two surgical teams and lasted 8 h and 39 min. Flap dissection followed a standardized approach^[7] with identification and intramuscular dissection of the abdominal perforators in a muscle-sparing fashion to the deep inferior epigastric vessels. Although a deep inferior epigastric perforator (DIEP) flap was initially planned, a small cuff of rectus muscle was intentionally left around the vascular pedicle to prevent pedicle kinking. Consequently, the reconstruction was formally classified as an muscle-sparing type II transverse rectus abdominis myocutaneous (MS-2 TRAM). Concurrently, the internal mammary vessels were prepared as recipient vessels, including partial resection of the fourth rib and release of scar adhesions. Based on intraoperative indocyanine green fluorescence angiography, the flap was limited to its right hemi-abdominal component to ensure sufficient tissue perfusion. Microsurgical anastomosis was performed, with venous coupling using a 2.5 mm device and arterial suturing using the open-book technique. Repeated indocyanine green fluorescence angiography confirmed adequate perfusion of the free flap tissue. Total ischemia time was 1 h and 23 min. The flap was

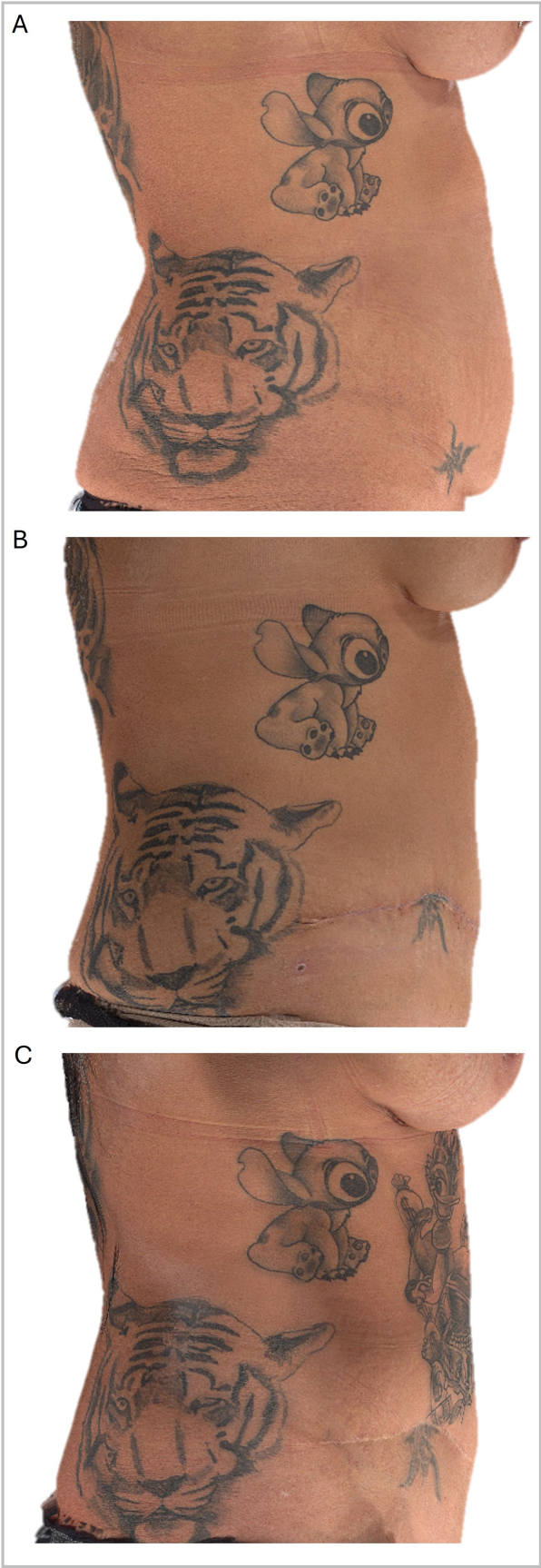


Figure 3. Lateral view showing postoperative abdominal contour enhancement at different time points. (A) Preoperative; (B) 2 weeks postoperative; (C) 25 months postoperative.

inset in a semi-upright position with reconstruction of the lower breast pole by a skin island (15 cm × 6 cm). Donor-site closure was performed as an abdominoplasty with mesh reinforcement of the anterior rectus sheath in a sublay technique and rectus diastasis plication.

At 3 months postoperatively, 80 mL of autologous fat was injected into the upper pole to improve upper pole fullness. At 11 months, 170 mL was grafted into the upper medial quadrant (50 mL), lateral breast (70 mL), and lower pole (50 mL). At 19 months, an additional 110 mL was injected into the left breast to further refine breast contour. The bilateral flanks were infiltrated with Klein tumescent solution, followed by vacuum-assisted liposuction. After decantation, the processed fat was reinjected using a multilayered, multichannel technique.

Follow-up and outcomes

Early postoperative course

The flap remained viable, soft, and well perfused, with no evidence of thrombosis, necrosis, or other major or minor adverse events (e.g., bleeding or wound-healing complications). The patient was discharged on postoperative day 9. At 2 weeks postoperatively, measurements showed that the left breast volume had increased to 748.8 cc. The sternal notch-to-nipple difference between the breasts decreased from 4.5 to 1.9 cm. [Table 1].

Outpatient follow-up

Follow-up was performed for 25 months. One month postoperatively, a localized 2 cm × 3 cm superficial wound dehiscence with fibrinous wound coating developed in the lateral third of the abdominal donor-site incision. Laboratory investigations and wound swab cultures revealed no evidence of infection or other underlying pathology. Delayed secondary wound closure resulted in complete wound healing without further revision. At final follow-up, substantially improved breast symmetry was achieved, with a residual volume difference of 119.6 cc (left > right) and a sternal notch-to-nipple difference of 1.6 cm [Table 1].

Compared with baseline, BREAST-Q domain scores, assessed at 1 and 6 weeks and at 6 and 25 months postoperatively, showed progressive improvement up to the final follow-up, particularly in the domains “Satisfaction with breast” (78) and “Psychosocial well-being” (82) [Table 2]. Sensation was fully restored at the donor site at the final visit. In the breast, sensation returned to the flap-reconstructed area. The patient denied any pain.

Discussion

Breast cancer incidence has increased in recent years, with diagnoses occurring at progressively younger ages^[8]. Consequently, expectations regarding the long-term stability and aesthetic outcomes of breast reconstruction have risen. Autologous reconstruction has therefore gained importance as a durable reconstructive option.

In the present case, marked breast asymmetry (right > left) developed following previous treatments. To correct this asymmetry, several attempts at implant placement were performed, each resulting in implant failure. Implant-based procedures are known to be associated with higher complication rates, particularly in previously treated tissue, as in the present case with prior surgery and radiotherapy. In such settings, complication rates have been reported to be up to eightfold higher compared with reconstructions using autologous tissue^[9]. Reported complications include capsular contracture, reconstruction failure, seroma formation and infection^[10], several of which occurred during the clinical course of our patient. The effect of radiotherapy on tissue, resulting for example in fibrosis and microangiopathy, increase the likelihood of implant-related complications, which may be up to twice as high in irradiated compared with non-irradiated

tissue^[11,12]. In our patient, prior treatments, including radiotherapy, and resulting repeated implant-related complications led to severe compromise of the left breast with loss of the lower pole. In contrast, the contralateral breast, which had not undergone prior surgery or radiotherapy, remained free of implant-related complications, consistent with the lower complication rates reported in untreated tissue. Alternative reconstructive options for the left-sided defect, including repeat implant-based reconstruction, serial lipofilling or pedicled flap reconstruction, were considered. However, given the irradiated breast, previous implant failures, the substantial volume deficit and the patient's preference for an autologous abdominal-based reconstruction, a microsurgical approach was favored.

The transfer of autologous tissue introduces well-vascularized, non-irradiated tissue into the compromised recipient site and thereby improves local perfusion and tissue quality. In our case, the flap not only restored breast volume but also functioned as a biological replacement for damaged skin and soft tissue, providing improved structural and functional properties. These findings align with the established benefits of autologous tissue transfer^[13]. The improved tissue characteristics create favorable conditions for wound healing and long-term tissue stability, which was reflected in the absence of flap-related complications such as flap loss, skin necrosis, wound-healing disorders, or infection at the recipient site. Furthermore, sensory recovery after autologous breast reconstruction has been described in the literature in a subset of patients^[14]. In our patient, sensation was present within the flap but absent in the native tissue of the upper pole, further supporting the functional restoration achieved by autologous tissue transfer.

Abdominally based autologous breast reconstruction has also been associated with donor-site benefits such as improved abdominal contour and simultaneous reconstruction or correction of abdominal wall defects, which may contribute to higher patient satisfaction^[15]. In our case, simultaneous correction of rectus diastasis combined with abdominoplasty resulted in both functional stabilization and aesthetic improvement of the abdominal wall [Figure 3]. This was reflected by maximum BREAST-Q scores in the categories "Satisfaction with abdomen" and "Physical well-being with abdomen" at final follow-up [Table 2]. (A limitation of this case report is the differing follow-up schedules for VECTRA and BREAST-Q assessments, which limited direct comparison of objective and patient-reported outcomes at corresponding postoperative time points). Smoking is a recognized risk factor for postoperative complications such as wound-healing disorders and may have contributed to the donor-site wound-healing disturbance observed in this case. Therefore, a smoking cessation period of at least four weeks before autologous breast reconstruction should be recommended in future cases.

Once successfully integrated, autologous breast reconstruction is considered a stable reconstructive solution that allows for durable breast symmetry^[16]. This observation was reflected in our patient by stable anthropometric measurements and sustained improvement in breast symmetry throughout the 25-month follow-up period. Serial VECTRA assessments demonstrated stable breast volume following reconstruction and adjunctive lipofilling procedures [Table 1]. Although a residual volumetric difference remained at final follow-up, the patient reported high satisfaction with the reconstructive outcome, indicating that subjective aesthetic satisfaction may be achieved despite measurable residual volumetric asymmetry. Representative VECTRA 3D images demonstrate a consistent aesthetic outcome [Figures 2 and 3]. Long-term patient satisfaction has been reported to be higher following autologous tissue-based breast reconstruction compared with implant-based reconstruction^[17]. One reason may be that autologous tissue adapts to physiological aging processes, weight fluctuations, and gravitational forces, resulting in a body perception that closely resembles that of natural breast tissue. In the present case, this was reflected by increasing BREAST-Q scores over time in "Satisfaction with breast," including items such as "Perception of the breast as a natural body part" (rated as "very satisfied") and "Psychosocial well-being," reaching high values at final follow-up [Table 2]. In the "Satisfaction with breast" domain, a marked early postoperative increase was

observed, followed by a slight decline between 6 weeks and 6 months, likely reflecting initial improvement relative to baseline and subsequent normalization of expectations. In the present case, high final scores were achieved, indicating a favorable aesthetic outcome from the patient's perspective. Lipofilling can support this outcome by addressing minor secondary contour irregularities that may occur following breast reconstruction. Autologous fat grafting represents a commonly used adjunctive technique for this purpose, offering low morbidity and relative ease of use. Given partial graft resorption, repeat procedures are often required and performed at individualized time points^[18]. In this case as well, lipofilling achieved progressive contour refinement, contributing to high patient satisfaction. Given the variable degree of fat graft resorption, volumetric changes following lipofilling should be interpreted within the context of the overall reconstructive process. Future studies may provide further insight into fat graft retention at different postoperative time points.

CONCLUSION

Overall, this case highlights that even in an initially highly challenging reconstructive situation, after multiple implant infections and extensive scarring, autologous reconstruction was not only feasible but achieved successful breast salvage. Simultaneously, it was associated with functional and aesthetic improvement of the abdominal wall and may therefore provide an additional benefit for the patient. This case suggests that early interdisciplinary decision-making may facilitate the development of an individualized and durable reconstructive strategy for breast reconstruction in complex clinical settings.

DECLARATIONS

Authors' contributions

Equal contribution, data collection, literature review, and manuscript drafting: Holzer P, Thierfelder N
Project supervision and manuscript revision: Mesas I
Surgical treatment of the patient and critical manuscript revision: Hagen CS, Haas EM, Moellhoff N
Clinical supervision and critical manuscript revision: Giunta RE
Project supervision and manuscript revision: Mesas Iv
All authors read and approved the final manuscript.

Availability of data and materials

Not applicable.

AI and AI-assisted tools statement

During the preparation of this manuscript, the AI tool ChatGPT (GPT-5.3, released 2026-03-03) was used solely for minor language editing. The tool did not influence the study design, data collection, analysis, interpretation, or the scientific content of the work. All authors take full responsibility for the accuracy, integrity, and final content of the manuscript.

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Conflicts of interest

Giunta RE is an Associate Editor of Plastic and Aesthetic Research. However, he was not involved in any aspect of the editorial process for this manuscript, including reviewer selection, manuscript handling, or editorial decision-making. The other authors declare that they have no conflicts of interest.

Ethical approval and consent to participate

According to institutional policy, ethical approval was waived for single-patient case reports (Ethics Committee of LMU Munich). Written informed consent was obtained from the patient.

Consent for publication

Written informed consent for publication of this case report and accompanying images was obtained from the patient.

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