

Staged Prosthetic Reconstruction with Fat Grafting for Severe Depressive Breast Deformation after Breast-conserving Therapy

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Summary: Breast-conserving therapy, where radiotherapy is performed after partial mastectomy, is a widely used surgical method that can preserve most of the breast tissue without increasing the recurrence rate of breast cancer. However, without reconstruction, asymmetry of the breast occurs due to the tissue defect and radiation fibrosis, producing in poor cosmetic results. In this case study, we performed staged prosthetic breast reconstruction combined with fat grafting for severe depressive deformation of the breast after breast-conserving therapy. The first surgery involved insertion of a tissue expander and fat grafting, second surgery was the reduction of injected saline volume and fat grafting, and third surgery involved exchange for an implant and fat grafting. The skin in the depressed area, which had atrophied, became soft and flexible; deformation was also improved, and the patient was satisfied with the aesthetic outcome. It is expected that fat grafting will fertilize and qualitatively improve the damaged tissue due to irradiation, reducing the complications related to the tissue expander and implant. We believe that it will be possible to correct a breast deformity after breast-conserving therapy using a tissue expander and implant, which had not been considered as a solution. The results showed that the present method can be an option for delayed reconstruction after breast-conserving therapy. (*Plast Reconstr Surg Glob Open* 2018;6:e1717; doi: 10.1097/GOX.0000000000001717; Published online 13 March 2018.)

Breast-conserving therapy, where radiotherapy is performed after partial mastectomy, has been widely conducted as a therapeutic strategy to preserve most of the breast tissue without increasing the recurrence rate of cancer in patients with relatively early breast cancer.¹ However, without reconstruction, the tissue defect and radiation fibrosis cause asymmetry of the breast, producing a poor cosmetic result.²

It is generally believed that prosthetic breast reconstruction is not a good solution for patients who have received radiotherapy,³ and thus, prosthetic breast reconstruction is not performed after breast-conserving therapy.⁴

However, in recent years, it has been found that fat grafting fertilizes and qualitatively improves the tissue damaged by irradiation,⁵ and cases of whole breast reconstruction with a tissue expander and implant using concomitant fat grafting in patients who have received radiotherapy after total mastectomy have been reported.⁶ Therefore, we describe details of a case where we performed breast reconstruction using a tissue expander and implant combined with fat grafting in a patient with severe depressive deformation of the breast after breast-conserving therapy.

CASE REPORT

The case was of a 47-year-old woman. She underwent partial mastectomy and postoperative radiotherapy (total dose, 50 Gy) because of breast cancer in the upper lateral part of the left breast 8 years ago at another hospital. She was referred to our hospital to treat the severe depressive deformation in the resected part of the breast. The skin of the resected part of the breast was atrophied and adhered to the chest wall, causing a severe depressive formation (Fig. 1). We planned staged prosthetic breast reconstruction combined with fat grafting.

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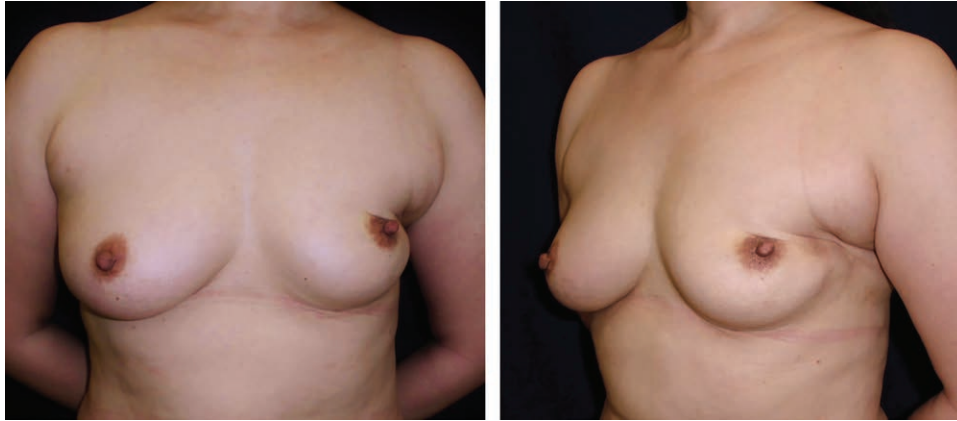


Fig. 1. Prereconstruction. The severe depressive deformity is confirmed.

Expander insertion and fat grafting were performed as the initial surgery. We first dissected the depressed skin and soft tissue from the chest wall through the previous partial mastectomy scar, and the space for expander insertion was created subcutaneously. Fats were collected from the medial part of both thighs. Epinephrine of 1:1,000,000 was injected into the predefined area, and fat was manually suctioned from the area through a minimal incision in both inguinal regions using a 60-cc syringe and 3-mm harvesting cannula (Tulip Medical Inc., San Diego, Calif.). The collected fat was centrifuged at 700 g for 3 minutes to remove blood cell components and oil, and the centrifuged fat of 40 cc was injected into the skin and soft tissue of the depressed part by the Coleman technique⁷ using a 16-gauge sharp needle. The expander (Natrell133 style LV150, Allergan, Dublin, Ireland) was subcutaneously inserted, and 100 cc of saline solution was injected during the surgery. Then 220 cc of saline solution was finally injected.

The second surgery was performed at 3 months after the initial surgery. The expander was temporarily removed, and 120 cc of fat from both thighs was injected into the lateral half of the left breast while confirming that none leaked into the lumen. The expander was again inserted by reducing the injection of saline solution to 100 cc.

The third surgery was performed at 3 months after the second surgery. The expander was removed, 155 cc of fat from both thighs was injected into the lateral half of the left breast, and an implant (Natrell410 style LF-125, Allergan) was inserted.

At the 2-year follow-up, the contracted skin remained soft and flexible; additionally, there was no exposure of the implant, and deviation of the nipple was remarkably corrected (Fig. 2). The patient is satisfied with the cosmetic appearance.

DISCUSSION

Local tissue rearrangement and breast reduction techniques are often performed as immediate reconstruction for breast-conserving surgery.⁴ When these surgeries are performed as delayed reconstruction after breast-conserving therapy, tissues within the radiation field adjacent to the defect site are used for reconstruction, resulting in a higher rate of complications with poor cosmetic result⁴; thus, reconstruction using the latissimus dorsi myocutaneous (LDM) flap is generally performed.⁸ In that case, exposure of the skin paddle, which is the skin replaced for contracture deformation at the defected site, to the breast surface becomes the cosmetic problem. To avoid this patchwork-like scar, it is necessary to expand the con-



Fig. 2. Two years after exchange for the implant. The contracture is relieved, and displacement of the nipple is largely corrected. The atrophied skin also became flexible.

tracted skin using the expander. Tomita et al.⁹ reported 2-stage reconstruction as delayed reconstruction after breast-conserving therapy, where the contracted skin of the defect site is expanded with expander and replaced with the LDM flap. However, careful attention is necessary to prevent the expander from penetrating the skin, and the use of the LDM flap reduces the option of reconstruction using autologous tissue when additional reconstruction is required in the future.

We performed delayed prosthetic reconstruction with fat grafting after breast-conserving therapy because we considered that performing only 1 of these procedures might cause a problem with the reconstruction. It is widely accepted that radiated patients are not good candidates for prosthetic breast reconstruction.³ Moreover, we thought that it might not be possible to augment the defect in this case with fat grafting only. Successful augmentation of the partial mastectomy defect with fat grafting only has been reported,⁵ but the amount of fat grafting for augmentation depends on the capacity of the recipient site.¹⁰ In this case, the skin of the partial mastectomy defect was considerably thin, resulting in the low volume of the recipient site; augmentation of the defect with fat grafting only appeared to be impossible. Therefore, prosthetic reconstruction with fat grafting was conducted to compensate for the shortcomings of both procedures, as they have a complementary relationship.

We will discuss the advantages of delayed reconstruction after breast-conserving therapy using an expander and implant combined with fat grafting that we described in this report. When the expander is inserted into the irradiation field in the initial reconstructive surgery, it is expected that fat grafting can qualitatively improve the ischemic fibrous tissue,⁵ reducing the occurrence of complications related to the expander. Skin and soft tissue firmly contracted and the severely depressed deformity was confirmed after breast-conserving therapy; however, the skin and soft tissue became soft and flexible, and displacement of the nipple was largely corrected postoperatively. Fat grafting is minimally invasive and does not reduce future options for reconstructions with autologous tissue. Three hundred fifteen cubic centimeters of fat was injected into the lateral half of the left breast; nevertheless, the soft tissue covering the implant was not thick. Fat grafting did not improve tissue quantity, but it improved tissue quality, contributing to successful reconstruction. By combining fat grafting, we believe that it will be possible to correct the breast deformity after breast-conserving therapy with an expander and implant, which had not been considered as a solution. However, the following points are the disadvantages: it requires multiple surgeries; a limited amount of fat can be collected in thin patients; and no expanders and implants fit perfectly in the shape of the

partial mastectomy defect, resulting in rough reconstruction. Therefore, the implant was used as a filler material for the partial mastectomy defect. We consider that the shape of the implant might not be a problem for filling the defect. With the cooperation of the patient, we performed 3 surgeries in total to avoid complications, such as exposure of the implant, as much as possible. If there is no problem on the skin of the contracted site, it is possible to omit the second surgery of reducing the amount of saline in the expander and injecting fat.

The follow-up period was 2 years in this case, but further careful follow-up is required to monitor for long-term complications, such as capsular contracture and thinning of the skin, which can possibly result in implant exposure.

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