

# Tissue Expander Capsule for Abdominal Wall in Autologous Breast Reconstruction

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**Summary:** Adjuvant treatment planning can change after breast cancer resection and definitive pathological examination. Radiation therapy is often chosen as a supplementary treatment. Rectus abdominis–based muscle flaps are one of the main choices when breast reconstruction plans must be changed from implant-based to autologous methods. We herein report a case in which the patient's own tissue expander capsule was used to repair an abdominal wall defect after muscle-sparing transverse rectus abdominis myocutaneous flap reconstruction. (*Plast Reconstr Surg Glob Open* 2014;2:e247; doi: 10.1097/GOX.0000000000000213; Published online 6 November 2014.)

Implant-based breast reconstruction is very effective, but some cases involve substantial patient-related risk factors. Adjuvant treatment planning can change after breast cancer resection because of the degree of tumor aggressiveness identified during the definitive pathological examination. In such cases, radiation therapy may be chosen as a supplementary treatment.<sup>1-3</sup>

Depending on the intensity of capsular formation, it may be necessary to change the reconstruction method so that autologous tissues are used. Rectus abdominis–based muscle flaps are often one of the first choices in these situations.<sup>4</sup>

An abdominal defect must be produced to harvest tissue for breast reconstruction, and tension-free closure is not always possible. In such cases, one can rely on muscular transposition, tension-relief incisions, or prosthetic materials to replace the ab-

dominal wall.<sup>5-9</sup> The use of allogeneic material to repair abdominal wall defects is not risk-free; infection, extrusion, herniation, and secondary bulging of the abdominal wall are all possible.

When an abdominal flap is being adapted to the recipient area, it is necessary to resect portions of the prosthetic capsule. The capsule is discarded after histopathological evaluation in all cases. Breast tissue expanders are mainly placed in a retromuscular fashion. After extensive institutional review, our team considered only the hypothetical possibility that viable tumor cells are present in the tissue expander capsule in the selected donor site underneath the pectoralis major muscle.

## CASE REPORT

A 55-year-old female patient was diagnosed with ductal breast carcinoma as confirmed by open biopsy. She underwent mastectomy and sentinel node resection followed by tissue expander–based reconstruction. After definitive pathological analysis, radiation therapy was recommended. Expansion was thus delayed until termination of the radiation therapy. Autologous reconstruction was subsequently indicated because of difficulties in expansion and the development of significant capsular contracture. Then a deep inferior epigastric perforator flap was planned.<sup>10</sup>

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*Received for publication June 29, 2014; accepted August 25, 2014.*

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DOI: 10.1097/GOX.0000000000000213

**Disclosure:** *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*

During the surgical procedure, identification of a dominant perforator was not possible, and a muscle-sparing transverse rectus abdominis myocutaneous flap was designed. A small, concentrated area of perforators (5×5 cm) with minimal muscle volume was collected along with the anterior rectus abdominis fascia (Fig. 1). Primary closure of the defect would have involved excessive tension due to intra-abdominal adiposity. The abdominal muscle thickness was inadequate for performance of muscular transposition or creation of a tension-releasing incision. The future development of abdominal weakness was also a concern.

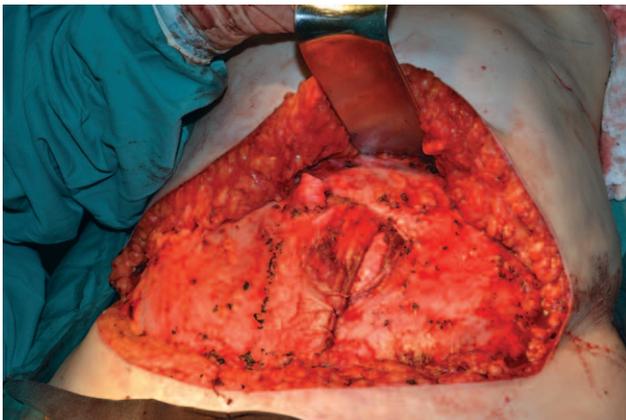
The use of allogeneic material to repair the abdomen was impractical due to social and economic issues and institutional logistics. Our team decided to use a retropectoralis portion of the tissue expander capsule for abdominal wall restoration (Fig. 2). We replaced the lost portion of the rectus abdominis muscle anterior fascia by placing the internal, smooth surface of the capsule toward the muscle and the external capsular surface in contact with the subcutaneous tissue. Macroscopic similarity between

the capsular tissue and rectus abdominis fascia was noted (Fig. 3). Abdominal closure was performed using progressive tension sutures between the flap and the muscle fascia as described by Baroudi and Ferreira<sup>11</sup> and Pollock and Pollock.<sup>12</sup>

The outcome was uneventful. There was no evidence of hernia formation, bulging, seroma formation, or surgical site infection. The abdominal wall contour was maintained during follow-up, and the patient resumed social activities with no major complaints. Magnetic resonance imaging 3 months after surgery demonstrated abdominal wall integrity (Fig. 4). Six months after the procedure, there was still no sign of abdominal weakness.

### DISCUSSION

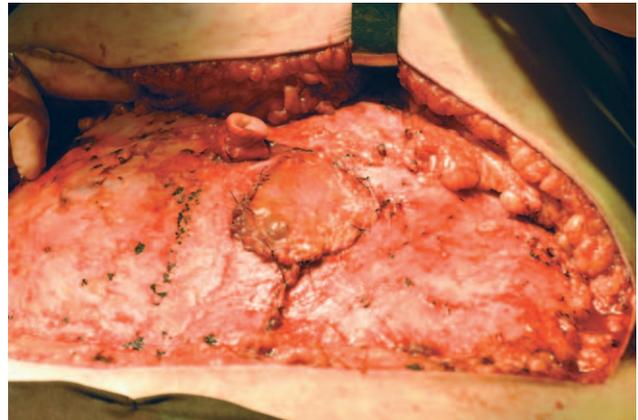
Uncertainty often surrounds adjuvant breast cancer treatment. The need for irradiation can be



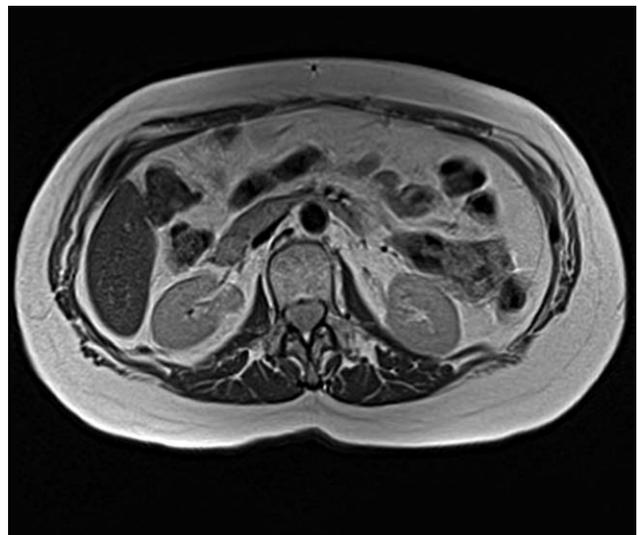
**Fig. 1.** The abdominal wall defect after harvesting the flap.



**Fig. 2.** The retropectoralis muscle portion of the breast capsule, measuring approximately 5×5 cm.



**Fig. 3.** The capsule replacing the lost portion of the rectus muscle anterior fascia.



**Fig. 4.** Abdominal wall integrity in abdominal magnetic resonance imaging performed 3 months after surgery.

difficult to predict. Changes in reconstruction procedure plans must be explained to the patient in these situations. It is necessary to provide a detailed explanation of the repair options and the positive and negative aspects of each.

Although the use of biological material to reconstruct the breasts has been reported, our team has no knowledge of any previous report of breast capsule reutilization in the specific setting presented herein. This method may be a viable alternative, although further studies are needed. In the present case, we observed no adverse events during the initial postoperative healing period.<sup>13–16</sup>

### CONCLUSIONS

The use of tissue expander capsule for reinforcement of the abdominal wall after the autologous breast reconstruction with a muscle-sparing transverse rectus abdominis myocutaneous flap has initially proved itself to be a safe and reliable option for abdominal wall restoration.

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### REFERENCES

- Jagsi R. Postmastectomy radiation therapy: an overview for the practicing surgeon. *ISRN Surg*. 2013;2013:212979.
- Pierce LJ. The use of radiotherapy after mastectomy: a review of the literature. *J Clin Oncol*. 2005;23:1706–1717.
- Moyer HR, Pinell-White X, Losken A. The effect of radiation on acellular dermal matrix and capsule formation in breast reconstruction: clinical outcomes and histologic analysis. *Plast Reconstr Surg*. 2014;133:214–221.
- Lipa JE, Qiu W, Huang N, et al. Pathogenesis of radiation-induced capsular contracture in tissue expander and implant breast reconstruction. *Plast Reconstr Surg*. 2010;125:437–445.
- Man LX, Selber JC, Serletti JM. Abdominal wall following free TRAM or DIEP flap reconstruction: a meta-analysis and critical review. *Plast Reconstr Surg*. 2009;124:752–764.
- Nahabedian MY, Dooley W, Singh N, et al. Contour abnormalities of the abdomen after breast reconstruction with abdominal flaps: the role of muscle preservation. *Plast Reconstr Surg*. 2002;109:91–101.
- Patel KM, Shuck J, Hung R, et al. Reinforcement of the abdominal wall following breast reconstruction with abdominal flaps: a comparison of synthetic and biological mesh. *Plast Reconstr Surg*. 2014;133:700–707.
- Fischer JP, Nelson JA, Wes AM, et al. The use of epidurals in abdominal wall reconstruction: an analysis of outcomes and cost. *Plast Reconstr Surg*. 2014;133:687–699.
- Zhong T, Janis JE, Ahmad J, et al. Outcomes after abdominal wall reconstruction using acellular dermal matrix: a systematic review. *J Plast Reconstr Aesthet Surg*. 2011;64:1562–1571.
- Nahabedian MY, Momen B, Galdino G, et al. Breast reconstruction with the free TRAM or DIEP flap: patient selection, choice of flap, and outcome. *Plast Reconstr Surg*. 2002;110:466–475.
- Baroudi R, Ferreira CA. Seroma: how to avoid it and how to treat it. *Aesthet Surg J*. 1998;18:439–441.
- Pollock H, Pollock T. Progressive tension sutures: a technique to reduce local complications in abdominoplasty. *Plast Reconstr Surg*. 2000;105:2583–2586; discussion 2587–2588.
- Selber JC, Clemens MW, Oates S, et al. Autoderm: an alternative bioprosthetic for breast reconstruction. *Plast Reconstr Surg*. 2013;131:985–987.
- Matros E, Disa JJ. Discussion: Fascia lata allografts as biological mesh in abdominal wall repair: preliminary outcomes from a retrospective case series. *Plast Reconstr Surg*. 2013;132:640e–641e.
- Ladizinsky DA, Sandholm PH, Jewett ST, et al. Breast reconstruction with the Bostwick autoderm technique. *Plast Reconstr Surg*. 2013;132:261–270.
- Bengtson BP, Ringler SL, George ER, et al. Capsular tissue: a new local flap. *Plast Reconstr Surg*. 1993;91:1073–1079.