Biplanar Technique for Breast Implant Replacement through Mastectomy Scar

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**Background:** Implant-based breast reconstruction is the most commonly used modality for breast reconstruction. A 2-stage reconstruction is employed when the skin envelope is insufficient. In the first stage, a tissue expander is placed in a pocket created beneath the pectoralis major muscle and an acellular dermal matrix (ADM). In the second stage, the expander is replaced with a permanent implant. Though the second stage is safer, some studies have published an immediate complication rate of up to 11.4%, and even higher in the event of prior radiotherapy.

**Methods:** We present a novel biplanar technique for implant replacement through the mastectomy scar. The goal of our technique is to make incisions of the skin and the incorporated ADM in 2 separate planes, hopefully lowering the risk for dehiscence, deep infection, and reconstruction failure. We conducted a retrospective review of patients who underwent tissue expander or implant replacement surgery using the biplanar technique between January 2012 and January 2018 by the senior author.

**Results:** Eleven consecutively presenting patients underwent 8 tissue expanders and 6 silicone implant replacement surgeries. Three patients had received prior radiation therapy in the operated breast. None of the patients had complications nor needed a revision surgery.

**Conclusions:** The biplanar technique for implant or tissue expander replacement through the mastectomy scar following breast reconstruction shows promising results in our series of patients and may prove useful in reducing postoperative incisional dehiscence, deep infection, and implant exposure. Nonetheless, further large-scale studies are required to evaluate the effectiveness of this technique.

(Plast Reconstr Surg Glob Open 2020;8:e2702; doi: 10.1097/GOX.0000000000002702; Published online 24 April 2020.)

INTRODUCTION

Implant-based breast reconstruction is the most commonly used reconstructive modality following mastectomy for breast cancer. A 2-stage expander-to-implant reconstruction is a popular approach employed when autologous tissue is inadequate, adjuvant radiotherapy is deemed necessary, or when the skin envelope is insufficient.

Acellular dermal matrix (ADM) has become an integral part of the expander or implant-based breast reconstruction and is currently used in over 75% of cases. ADM provides an ideal structure for cellular ingrowth and remodeling, and has been shown to be fully incorporated clinically and histologically by the second stage of reconstruction.

ADM is commonly placed as a sling between the inferior edge of the pectoralis muscle and the inframammary fold (IMF) to provide support for the expander. The use of ADM is thought to have a number of benefits, including the creation of esthetically superior breast shape by controlling implant position and improved tissue expansion dynamics, resulting in shorter expansion time and less patient discomfort.

In a 2-stage reconstruction, the second stage is usually performed through the original mastectomy scar, which represents a particular challenge, as tissues are attenuated postexpansion and are often damaged by radiation therapy. The immediate complication rate is up to 11.4%, and even higher in the subgroup of radiotherapy-treated patients, dehiscence, and infection being the most common.

Disclosure: The authors have no financial interest to declare in relation to the content of this article.
Surgical Technique
First, we mark the part of the mastectomy scar to be excised, about 5 cm long, at the mid-lateral part of the scar. Following scar excision, a plane is developed caudally between the incorporated ADM and the subcutaneous tissue. This plane is usually very clear and easy to develop (Fig. 1). After developing the plane for approximately 3 cm, we incise the incorporated ADM, and typically present capsule beneath, to reach the implant (Fig. 2).

We then remove the tissue expander or implant, perform a revision of the pocket, when necessary, and irrigate the pocket with antibiotic solution. A JP10 drain is left, if necessary, and a permanent implant is inserted. Subsequently, we use Vicryl 3/0 sutures to close the incision in the incorporated ADM and to approximate the deep dermis of the skin incision, followed by Monocryl 4/0 sutures for subcuticular skin closure.

Patients and Outcomes
A review of 11 patients, who underwent 14 implant or expander replacement surgeries using the biplanar technique between January 2012 and January 2018 by the senior author, is presented. These patients underwent breast reconstruction using a tissue expander or a permanent silicone implant, placed under the pectoralis muscle and an ADM for lower pole coverage.

Patients’ demographics, medical history, operative complications, and surgical outcomes were reviewed.

RESULTS
Eleven consecutively presenting patients underwent 14 implant or tissue expander replacement surgeries. The mean age was 49 years (range 28–67). The mean body mass index (BMI) was 26.8 kg/m² (range 18–35.8). Two patients had diabetes, 2 had hypertension, and 1 was an active smoker. Nine patients underwent mastectomy due to malignancy, 1 patient due to a benign tumor, and another patient underwent prophylactic mastectomy due to BRCA gene mutation. Sentinel lymph node biopsy was performed in 8 of the operated breasts and an axillary lymph node dissection in 2 cases. Three patients received radiation therapy to the operated breast and 6 patients were treated with chemotherapy. The mean follow-up was 27.5 months (range 12-46).

We replaced a tissue expander in 8 of the breasts and a silicone implant in 6 of the breasts. The mean interval for a replacement surgery was 15.1 months (range 5–30 months). The mean hospitalization time postsurgery was 1.3 days (range 1–2 days). None of the patients experienced wound breakdown or infection, and no revision surgery was needed. Table 1 summarizes complication data after implant replacement surgery from previous studies and our cases.

DISCUSSION
Implant-based breast reconstruction is the most commonly used reconstructive modality. A 2-stage expander-to-implant approach is preferably employed in some instances and is supported as more predictable and reproducible. Due to several advantages, ADM is commonly used as a sling between the inferior edge of the pectoralis muscle and the IMF, and was shown to be fully incorporated by the time of the second stage of reconstruction.

The second stage is usually performed through the original apically located mastectomy scar, a particular challenge that increases the odds of complications, since tissues are attenuated postexpansion and often damaged by radiation therapy.

The biplanar technique, we describe, separates the planes of the external incision of the skin and the internal incision of the incorporated ADM, serving to reduce the tension on each incision, preventing direct contact of the implant with the skin incision, and providing a protective layer in the case of wound dehiscence, hopefully reducing the risk of deep infection and reconstruction failure.

Our experience with this technique is encouraging. It is easy to perform, allows good visualization and revision of the pocket, and shows good results, without acute complications, even in the irradiated breast.

Though we lack experience using this technique in replacing implants or tissue expanders following prepectoral breast reconstruction, this technique should be feasible in these cases as well.

CONCLUSIONS
Our experience with the biplanar technique for implant replacement through the mastectomy scar
following breast reconstruction using ADM is encouraging and may prove useful in reducing postoperative incisional dehiscence, deep infection, and implant exposure. Nonetheless, further large-scale studies are required to evaluate the effectiveness of this technique.

Table 1. Complication Data after Implant Replacement Surgery—Previous Studies

| Article                      | All Patients | Irradiated Subgroup |
|------------------------------|--------------|---------------------|
|                             | n           | Complications (%)   | Reoperation (%) | n           | Complications (%) | Reoperation (%) |
| Hirsch et al⁷                | 1,017       | 7.2                 | N/A             | N/A         | N/A               | N/A             |
| Lovecchio et al⁸             | 1,271       | 1.5                 | 1.7             | 491         | 10.1              | 10.1             |
| Karunanayake et al¹⁰         | 70          | 11.4                | 5.7             | 15          | 26.7              | 20               |
| Our study                   | 11          | 0                   | 0               | 3           | 0                 | 0               |

N/A, not applicable.

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