

Assisted Breast Reconstruction With Biosynthetic Mesh and Implants: A Pilot Study

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Summary: The use of acellular dermal matrix in implant-based breast reconstruction has been associated with high complication rates. A biosynthetic mesh (GORE BIO-A) may reduce the incidence of complications while maintaining similar functional characteristics. No study has evaluated this material exclusively. This article sought to fill this gap by presenting a retrospective analysis of patients at high risk for complications (13 patients; 23 breasts), who underwent immediate implant-based breast reconstruction with GORE BIO-A. The mean age of this cohort was 41.8 years (range: 31–56 y). The mean follow-up period was 15.6 months (3–44 mo), and the mean implant volume was 383 mL (330–490 mL). Early complications occurred in 6 breasts, all managed conservatively. The Baker classification for capsular contracture showed grade I in 18 breasts. Radiotherapy affected capsular contracture ($P = 0.03$). Of the 10 breasts that underwent radiotherapy, 4 had grade III contracture. Based on the Harvard scale and BCCT.core evaluations, the aesthetic outcome was rated as good or excellent in 11 of 13 and in 12 of 13 cases, respectively. The EORTC QLQ-BREC23 questionnaire used to assess quality of life showed high levels of satisfaction with the surgery (100.0%), the breast (77.8%), and nipple preservation (100.0%). Few side effects were recorded. Although further studies are required, these outcomes indicate that, in high-risk groups, breast reconstruction using the GORE BIO-A biosynthetic matrix may be feasible, with acceptable complication rates and good quality-of-life outcomes. (*Plast Reconstr Surg Glob Open* 2025;13:e7328; doi: [10.1097/GOX.0000000000007328](https://doi.org/10.1097/GOX.0000000000007328); Published online 3 December 2025.)

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INTRODUCTION

Breast implants or expanders, either prepectoral or retropectoral, facilitate breast reconstruction.¹ Acellular dermal matrix (ADM) supports muscle pocket creation and lower pole control in breast reconstruction, reducing capsular contracture rates and revision procedures.² Conversely, synthetic meshes may not offer the same reconstructive benefits.^{2–4}

GORE BIO-A, an absorbable biosynthetic mesh (67% polyglycolic acid and 33% trimethylene carbonate), is used for tissue reinforcement.⁵ It retains tensile strength for approximately 6–8 weeks and undergoes gradual resorption, typically completing tissue remodeling and integration within 6–7 months. GORE BIO-A provides a temporary scaffold for cell growth and angiogenesis, degrading thereafter. However, its complication profile in high-risk patients remains underexplored.⁶

This retrospective study evaluated complications, cosmetic outcome, and quality of life in implant-based breast reconstruction using GORE BIO-A. Institutional review board approval was obtained (CAAE 73596023.4.1001.5040).

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

Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.

SURGICAL TECHNIQUE

Thirteen patients (23 breasts) were evaluated between 2021 and 2024. All procedures were performed by a single surgeon (F.P.C.). The GORE BIO-A matrix was used selectively in high-risk cases, defined by the presence of least one of the following: prior radiotherapy, local recurrence after previous treatment, or prior aesthetic/mastopexy procedures resulting in flaps deemed intraoperatively inadequate for standard mastectomy-based reconstruction. Although not all prior procedures increase the risk of complications,⁶ patients in our cohort were selected due to clinical or technical factors. The choice of this material was based on its absorbable nature and lower cost compared with biologic matrices.

In retropectoral cases, the mesh was positioned along the inferior pole of the pectoralis major muscle. In prepectoral reconstructions, the mesh was not used to fully cover the implant due to its firmer consistency compared with ADMs. Instead, it was used to support specific areas of the flap. The decision between prepectoral and retropectoral implant placement was made intraoperatively based on the characteristics of the mastectomy flaps. These flaps were created according to standard oncological principles. Implant size was based on the primary breast volume. No patient underwent synchronous mastopexy or lipofilling.

Before use, the BIO-A matrix, which has a firm texture with sharp edges, was hydrated with 0.9% saline solution to soften it and trimmed to blunt it. Perforations were made to mitigate seroma formation. The matrix was positioned with the pectoralis major muscle or at the target flap sites and secured with absorbable sutures. (See figure, **Supplemental Digital Content 1**, which displays the GORE BIO-A mesh, already hydrated and fenestrated, positioned with the implant, <https://links.lww.com/PRSGO/E524>.) Subsequently, implants were positioned based on breast base measurements and desired projection (Fig. 1). Drains were used in all cases. We evaluated major complications.

Takeaways

Question: What are the complication profile, cosmetic outcomes, and quality-of-life results in patients undergoing total breast reconstruction using GORE BIO-A mesh?

Findings: In this retrospective pilot study of high-risk patients undergoing total breast reconstruction with implants, the use of GORE BIO-A mesh had an acceptable complication profile, as well as favorable cosmetic outcomes and high patient-reported quality of life.

Meaning: Although this study shows promising results, controlled studies with a larger number of patients and longer follow-up are warranted to evaluate the role of the GORE BIO-A mesh in breast reconstruction.

RESULTS

Mean follow-up time was 16.2 months (range: 3–44 mo), and mean age was 41.6 years (31–56 y) (Table 1). Two patients had comorbidities (systemic arterial hypertension and diabetes). Mean implant volume was 383 mL (330–490 mL). Ten breasts (43.5%) underwent radiotherapy. Eleven procedures involved prepectoral placement (47.8%). One patient used a tissue expander.

Early complications, which were managed conservatively, developed in 6 breasts/4 patients (Table 2). There were no cases of implant loss. According to the Baker classification, 4 breasts (13%) had capsular contracture grade III (all previously irradiated). Of the nonirradiated cases, 12 (92.3%) had grade I contracture (Table 2).

Using the Harvard scale, aesthetic outcomes were rated as excellent (n = 8), good (n = 3), regular (n = 1), and fair (n = 1), whereas BCCT.core analysis rated outcomes as excellent (n = 5), good (n = 7), and fair (n = 1). Patient-reported outcomes evaluated using the EORTC QLQ-BRECON23 indicated high satisfaction with the surgery. (See table, **Supplemental Digital Content 2**, which displays EORTC QLQ-BRECON23 values, <https://links.lww.com/PRSGO/E525>.)

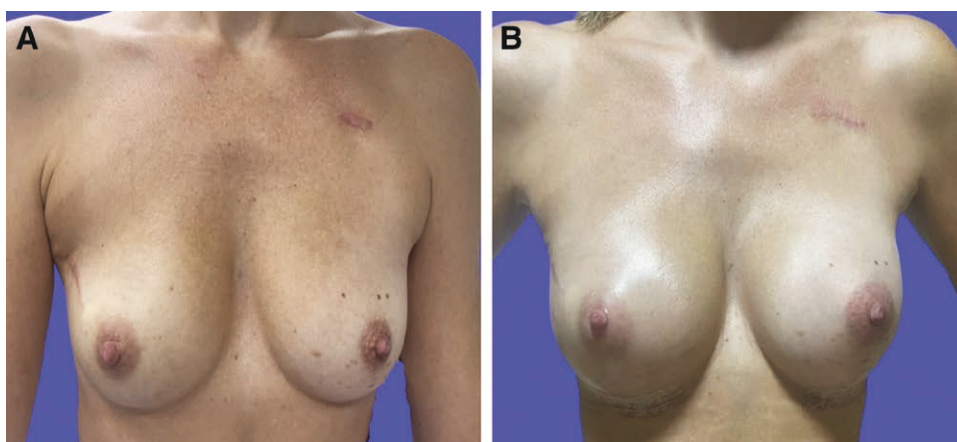


Fig. 1. Previous to surgery. A, Sectorectomy through a radial scar and previous radiotherapy for breast cancer. B, Right mastectomy performed through the inframammary fold and immediate reconstruction using a prepectoral implant and GORE BIO-A matrix.

Table 1. Patients' Clinical and Demographic Characteristics (n = 13)

Characteristics	Mean ± SD (minimum–maximum)
Age, y	41.6 ± 8.3 (31–56)
Body mass index, kg/m ²	23.6 ± 2.9 (20.4–31.1)
Follow-up, mo*	15.6 ± 12.2 (3–44)
	n (%)
Body mass index classification	
Normal weight	8 (61.5)
Overweight	4 (30.8)
Grade 1 obesity	1 (7.7)
Comorbidity	
Absent	11 (84.6)
Present	2 (15.4)
Aesthetic outcome/Harvard Scale	
Excellent	8 (61.5)
Good	3 (23.1)
Reasonable	1 (7.7)
Fair	1 (7.7)
Aesthetic outcome/BCCT.core results	
Excellent	5 (38.5)
Good	7 (53.8)
Fair	1 (7.7)

*From the date of surgery with the mesh until the last follow-up visit.

DISCUSSION

Reconstruction using implants and meshes aims to achieve adequate breast volume while restoring natural contours and texture. Numerous meshes have been used, with conflicting reports regarding outcomes.³ This study found acceptable early complication rates using GORE BIO-A mesh. These rates were comparable to those reported in procedures performed without a mesh.^{6,7}

Although synthetic meshes are generally cost-effective and may reduce complication rates, they tend not to achieve the aesthetic outcomes attained with ADMs. In a study involving 39 patients, polyglactin mesh yielded higher rates of capsular contracture and implant malposition compared with ADMs. Multiple studies have shown that, in implant-based reconstruction, ADMs enhance breast contour while reducing capsular contracture; however, they are also linked to higher complication rates.^{2–4,6}

Conversely, the present study showed a complication profile comparable to reconstructions without ADMs. This may be attributed to the synthetic, absorbable nature of GORE BIO-A, which likely elicits a minimal immune response. Notably, no cases of “red breast,” a previously reported reaction,⁸ were observed. Another possible contributing factor is the lower volume of GORE BIO-A used in this cohort. A study involving 374 patients found that higher ADM volume was associated with complication rates.⁹ However, this remains speculative and was not evaluated in our study, and warrants further investigation.

Although a 26% rate of early complications and 17.4% rate of Baker grade III capsular contracture were observed, all complications were managed conservatively,

Table 2. Pre- and Posttreatment Characteristics of the Breasts Submitted to Surgery (n = 23)

Characteristics	n (%)
Radiotherapy	
No	13 (56.6)
Yes	10 (43.4)
Type of implant	
Direct-to-implant	21 (91.3)
Tissue expander	2 (8.7)
Implant placement	
Prepectoral	11 (47.8)
Submuscular	12 (52.2)
Type of incision	
Inframammary fold	22 (95.6)
Periareolar	1 (4.4)
Complications	
All complications	6 (26.0)
Dehiscence	2 (8.7)
Nipple necrosis	2 (8.7)
Hematoma	1 (4.3)
Capsular contracture*	
Grade 1	18 (78.3)
Grade 2	1 (4.3)
Grade 3	4 (17.4)
Capsular contracture* irradiated cases	
Grade 1	6 (60)
Grade 2	0 (0)
Grade 3	4 (40)
Capsular contracture* nonirradiated cases	
Grade 1	12 (92.3)
Grade 2	1 (7.7)
Grade 3	0 (0)

*Baker scale.

and no implant loss occurred. Radiotherapy increases capsular contracture. These outcomes must be interpreted in the context of a high-risk cohort, which included prior radiotherapy. The complication profile seems manageable given the complexity of the population and may reflect the reality of reconstruction in patients with elevated baseline risk. In a related context, a study compared meshes for abdominal wall reinforcement in breast reconstruction and found that the biosynthetic option was associated with fewer complications.¹⁰ Although capsular contracture was assessed at a mean follow-up of 16 months, we acknowledge that this interval may be insufficient to evaluate late-onset contracture or aesthetic outcomes. Nevertheless, cosmesis and quality of life were considered high.

Matrices may not be required for all cases of prepectoral reconstruction but may be beneficial when flap quality is poor. In this study, prepectoral reconstructions yielded satisfactory results. The choice of implant plane—prepectoral or retropectoral—was individualized based on intraoperative assessment of mastectomy flaps. This selective approach, although introducing variability, reflects common clinical decision-making to ensure flap safety.

This study has several limitations, including its retrospective design, small sample size, single-center setting, and short follow-up period. Therefore, the results should be interpreted as hypothesis-generating. Prospective

studies are needed to better evaluate the role of GORE BIO-A mesh in breast reconstruction.

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DISCLOSURES

Dr. Cavalcante has received consulting fees from AstraZeneca; received payment or honoraria from Roche, Pfizer, Libbs, Merck, AstraZeneca, and Daiichi Sankyo; received support for attending meetings from Merck; and served as a board member for Merck and AstraZeneca. Dr. Zerwes has received payment for lectures from the following companies: AstraZeneca, Merck, Novartis, Daiichi Sankyo, and Roche. He has received support for attending meetings and/or for travel from AstraZeneca and has served as a board member for Merck. Dr. Millen has received payments or honoraria from Lilly. Dr. Mattar has received consulting fees from Roche, Merck, Novartis, and Eli Lilly. He has received payment or honoraria from Roche, Merck, Novartis, Eli Lilly, Daiichi Sankyo, and Exact Science. He has received support for attending meetings from Roche and Merck and has served as a board member for Roche. In addition, he has received stock or stock options from Eli Lilly and Novo Nordisk. Dr. Antonini has received payment or honoraria from Gilead, AstraZeneca, and Daiichi Sankyo. Dr. Brenelli has received payments or honoraria for lectures, presentations, speakers' bureaus, manuscript writing, or educational events from Merck, Lilly, Roche, Novo Nordisk, and GC Aesthetics. Dr. Bagnoli has received payments or honoraria from Merck, GORE, Endomedical, Invasive, Pierre Fabre, Blanver, and Polytech. Dr. Garcia has received payments or honoraria from Novartis, Agendia, Roche, Merck, AstraZeneca, and Lilly, and has served as a board member for Merck. The other authors have no financial interest to declare in relation to the content of this article.

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