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COMMENTARY

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Delayed acellular dermal matrix assisted prepectoral breast reconstruction: Preliminary results

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Immediate prepectoral breast reconstruction after conservative mastectomy had a widespread diffusion in the last years.[1,2] In our opinion, the indications to the prepectoral implant placement should not be limited to the immediate reconstruction but can be extended to some cases of delayed reconstruction. This article portrays our series of delayed acellular dermal matrix (ADM)-assisted prepectoral reconstruction using preshaped porcine-derived Braxon (Decomed Srl).

A prospective study was conducted among patients who underwent delayed ADM-assisted (Braxon) prepectoral reconstruction from January 2017 to December 2018. Patients included had a previous (>1 year before) mastectomy with submuscular implants or tissue expander (TE) reconstruction and presented one or more of the following complications: severe animation deformity, alteration of shape, implant malposition, dysfunctional chronic chest pain, submuscular implant loss after infection.

In case of pinch test >3 cm at the upper pole and >1 cm at the lower pole, the patient was considered a good candidate to conversion; in case of pinch test >1.5 cm <3 cm at the upper pole and >1 cm at the lower pole one or more preparatory fat grafts were performed before the implant position conversion. Patients with pinch test <1.5 cm at the upper pole were excluded.

A distinguishing group of patients suitable for prepectoral delayed reconstruction includes those needing delayed reconstruction after nipple sparing mastectomy (NSM) and submuscular TE with previous contralateral breast reconstruction with autologous tissues, and impossibility for clinical, intraoperative, or psychological reasons to perform a second free or local flap.

Patient's satisfaction was measured using BreastQ ["satisfaction with breast"-"satisfaction with outcome" domains].

Implant pocket was accessed through the previous scar and the plane over the anterior capsule was undermined. The pectoralis major (PM) was then dissected from the overlying subcutaneous tissue recreating a new pocket. After implant removal, anterior or subtotal capsulectomy was performed. The inferior border of the PM was anchored to the posterior capsule or the chest wall (Figure 1).

Total implant coverage with Braxon was prepared. The ADM implant was placed in the new prepectoral space and anchored to the muscle using cardinal sutures (3,6,9, and 12-clock positions) with 2/0 vicryl sutures. Tissue glue (Evicel) was sprayed, or supplementary stitches were placed between the ADM and subcutaneous layer.

A total of 20 breast in 13 patients (7 bilateral, 6 unilateral reconstructions) with a mean age of 50.8 years (33-59) were selected for delayed total coverage ADM-assisted prepectoral breast reconstruction.

Two patients (4 breasts) presented an animation deformity complicated by chronic pain in 1 case. Four patients (8 breasts) presented an implant malposition with an alteration of shape (Figure 2). Two patients (3 breasts) had a surgical history of implant loss after infection and underwent 3 sessions of fat grafting before the conversion.

Three patients (3 breasts) presented a submuscular reconstruction with TE after NSM and previous contralateral autogenous reconstruction with DIEP flap; in two cases any local or free flap was considered adequate to restore a satisfactory breast symmetry, in one case social and psychological conditions of the patient were not suitable to face a major surgery.

Anatomic textured implants with a high or extra high projection (Polytech 20746-20747) were used (volume range 265-615 cc).

Mean follow-up was 14.2 months (range, 28-6 months).

Complications were seen in 1 breast (5.2%) [seroma required in-office drainage]. No implant deformities, implant removals, or infections were observed. All 4 breasts were noted to have complete resolution of animation deformity.

BreastQ showed an improvement of patients reported satisfaction with a median (Quartile Rank) score increase of 24 points for the "satisfaction with breast" domain ($P < .0001$) and a decrease of 20 points for the "satisfaction with outcome" domain ($P < .001$) (Table 1).

To our knowledge, the reoperative rate in submuscular breast reconstruction is not reported in literature. Anyway, animation

deformity represents one of the principal reasons, followed by implant malposition, alteration of and dysfunctional pain.[3] At the present time, the main surgical treatment for the aforementioned complications is the fat grafting.[4]

A series of 10 patients undergoing pocket change using human ADM to treat muscular distortion has been published by Hammond and reports a complete resolution of the animation deformity.[5] Similarly, Lentz and Gabriel presented two retrospective series of 31 and 102 patients who underwent prepectoral revision reconstruction using human ADM and fat graft, with optimal aesthetic results and complete resolution of animation deformity.[6,7] Anyway, these previous studies described different techniques of human ADM insetting (frontal inferior with or without frontal superior coverage, total frontal coverage, frontal coverage with partial posterior coverage) depending on patient preoperative situation.

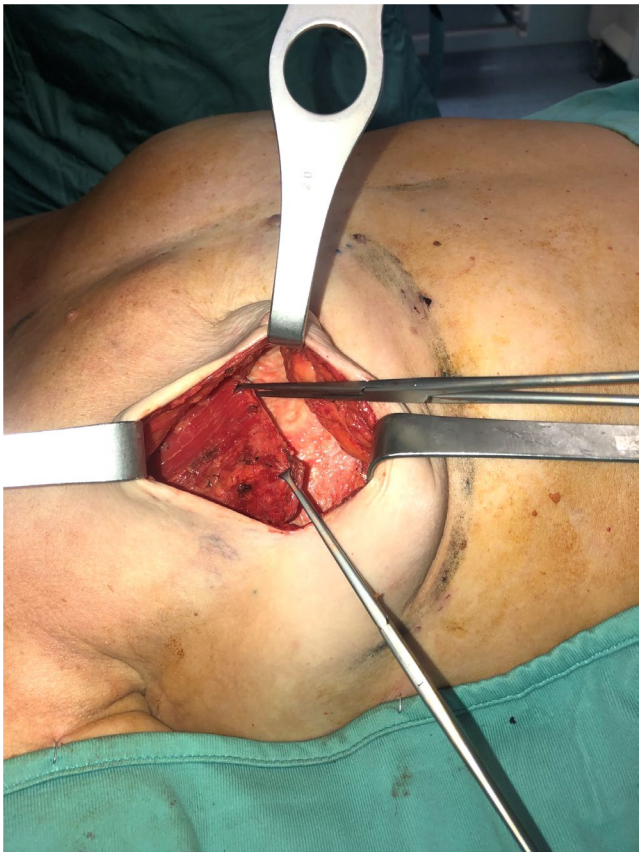

FIGURE 1 Surgical technique: PM was dissected from the anterior capsule and from the overlying subcutaneous tissue and repositioned on the chest wall

We propose a standardized technique using a preshaped porcine-derived ADM (Braxon Decomed Srl) that provides a total coverage of the implant in the new prepectoral pocket.

Berna[8] has previously reported 2 cases of pocket change using Braxon, to treat a breast dancing syndrome and a capsular contracture with excellent results.

In our opinion not only in case of severe animation deformity but also in case of alteration of shape or chronic pain, the delayed ADM-assisted prepectoral reconstruction can represent a safe and stable solution in selected case (adequate pinch test before or after fat graft).

The last indication in our series was a retropectoral TE reconstruction after NSM in patient with previous contralateral autologous breast reconstruction. In our opinion, thanks to the dynamism and the naturalness reachable by the prepectoral implant positioning, total coverage ADM can be successfully used in case a second free or a local flap cannot be performed due to clinical, intraoperative or psychological reasons, in patients with previous autologous contralateral breast reconstruction. The aforementioned concept of dynamic reconstruction depends on the fact that, differently from retropectoral implants or prepectoral reconstruction with polyurethane implants[9] in which the prosthesis tenaciously adheres to the mastectomy flap and is therefore motionless, total coverage ADM plus implant prepectoral reconstruction leaves a slight degree of mobility of the implant in the prepectoral pocket. This mobility represents a double-edged weapon because it permits to obtain a very natural result but it requires at the same time a really accurate choice of implant size and positioning.[10]

In conclusion, our series suggest that indications to total coverage ADM-assisted prepectoral implant placement should not be limited to the immediate reconstruction but can be extended to selected cases of delayed reconstruction. Reinforcement of skin envelope with ADM and any previous fat grafts permits to perform a safe delayed

FIGURE 2 On the left patient underwent a left NSM and breast reconstruction with a subpectoral TE.On the right 10 mo postoperative view after delayed ADM-assisted prepectoral conversion with anatomical implant (Polytech 20 746 460 mL) and contralateral mastopexy. The conversion achieved both goals of enhancing the breast shape and fixing the breast animation

TABLE 1 BreastQ

	Presurgery (n = 13)	Postsurgery (n = 13)	*P*
Satisfaction with breast, mean(±SD)	35.15 ± 4.1	56.7 ± 5	<.0001
Median(Quartile rank)	34(31.5-39)	58(53-61)	
Physical well being, mean(±SD)	23 ± 10.8	5.5 ± 3.8	.001
Median(Quartile rank)	28(22-30)	8(0-8)	

reconstruction with stable result. This standardized technique using a preshaped porcine-derived ADM that provides a full implant coverage in the new prepectoral pocket can be a viable solution to treat different types of secondary aesthetic and functional complications after subpectoral implant-based breast reconstruction such as animation deformity, implant malposition, chronic chest pain, and breast shape alteration.

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REFERENCES

1. Sbitany H, Piper M, Lentz R. Prepectoral breast reconstruction: a safe alternative to submuscular prosthetic reconstruction following nipple-sparing mastectomy. *Plast Reconstr Surg*. 2017;140:432-443.
2. Ter Louw RP, Nahabedian MY. Prepectoral breast reconstruction. *Plast Reconstr Surg*. 2017;140:51S-59S.
3. Walia GS, Aston J, Bello R, et al. Prepectoral versus subpectoral tissue expander placement: a clinical and quality of life outcomes study. *Plast Reconstr Surg Glob Open*. 2018;6(4):e1731.
4. Alnaif N, Safran T, Viezel-Mathieu A, Alhalabi B, Dionisopoulos T. Treatment of breast animation deformity: a systematic review. *J Plast Reconstr Aesthet Surg*. 2019;72(5):781-788.
5. Hammond DC, Schmitt WP, O'Connor EA. Treatment of breast animation deformity in implant-based reconstruction with pocket change to the subcutaneous position. *Plast Reconstr Surg*. 2015;135(6):1540-1544.
6. Gabriel A, Sigalove S, Sigalove NM, et al. Prepectoral revision breast reconstruction for treatment of implant-associated animation deformity: a review of 102 reconstructions. *Aesthet Surg J*. 2018;38(5):519-526.
7. Lentz R, Alcon A, Sbitany H. Correction of animation deformity with subpectoral to prepectoral implant exchange. *Gland Surg*. 2019;8(1):75-81.
8. Berna G, Cawthorn SJ, Papaccio G, Balestrieri N. Evaluation of a novel breast reconstruction technique using the Braxon® acellular dermal matrix: a new muscle-sparing breast reconstruction. *ANZ J Surg*. 2017;87(6):493-498.
9. De Vita R, Buccheri EM, Villanucci A, Pozzi M. Breast reconstruction actualized in nipple-sparing mastectomy and direct-to-implant, prepectoral polyurethane positioning: early experience and preliminary results. *Clin Breast Cancer*. 2019;19(2):e358-e363.
10. Salgarello M, Barone AL, Mangialardi ML. A case of important weight loss after a prepectoral breast reconstruction. *Eur J Plast Surg*. 2018;41(5):601-604.