Mammary Reconstruction Using Tissue Expander and Partial Detachment of the Pectoralis Major Muscle to Expand the Lower Breast Quadrants

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Abstract: The techniques commonly used in breast reconstruction with tissue expanders do not provide a good definition of the lower breast quadrant. With the authors' technique a better profile of the breast is achieved. Partial detachment of the pectoral muscle is performed, suturing it to the lower skin flap and thereby avoiding cranial migration of the expander. In addition a rounded shape of the lower quadrants is achieved and the expander remains in a subcutaneous position.

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Since its introduction by Radovan[1] more than 20 years ago, the use of tissue expanders in breast reconstruction has become a classic technique. Since then, the technique has greatly improved with the introduction of double-lumen expanders[2–6] and, later, differential expanders with an integrated valve and anatomic prosthesis.[7–9]

To avoid expander extrusion, the expander should be placed in a submuscular position. Thus, in some patients, the serratus muscle is sutured to the pectoralis major muscle or the latter is sutured to the pectoralis minor muscle. Complete submuscular placement favors cranial migration of the expander and impedes good breast definition, especially in the lower quadrants.

Our technique consists of the detachment of the pectoralis major muscle at a sternal level at the lower medial limit and the sixth rib. A tissue expander is placed in a submuscular position to achieve definition of the upper quadrants on an inclined plane, to avoid elevation of the breast during tissue expansion, and to acquire a round shape in the lower quadrants of the breast with the placement of the subcutaneous expander at this level.

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METHODS AND MATERIALS

Technique

The site of the placement of the tissue expander is designed first, as are the size of the pocket and the situation of the new submammary fold. The pocket is dissected up to 2 cm below the level of the submammary fold of the contralateral breast.

The surgical approach is performed by mastectomy incision. The upper subcutaneous flap is dissected superiorly to the infraclavicular region, with careful separation from the pectoral major muscle to avoid lesions. The cutaneous flap is dissected caudally until the sixth rib above the pectoralis major and serratus muscles and the rectoabdominal fascia. Both upper and lower subcutaneous dissection are important to achieve good adaptation of the cutaneous flaps and the pectoralis major muscle. The pectoralis major is then detached from the sternum at its lower level from the area located in the 3-o'clock to the 6-o'clock position on the right side, and the area from the 6-o'clock to the 9-o'clock position on the left side. The insertions of the pectoralis muscle are sectioned at the level of the sixth rib (Fig. 1). It is important not to detach a greater area of the muscle at the sternal level to avoid retraction. A pocket is then dissected by detaching the pectoralis major muscle up to the clavicular margin.

On preparation of the surgical pocket, the anatomic expander with an integrated valve, full height or low height, is placed under the pectoral muscle, and the free edge of the pectoral muscle is sutured to the lower cutaneous flap at 2 cm with transfixing stitches or in the fatty tissue (Fig. 2). We initially sutured the muscle directly at the lower edge of the incision; however, lumping was observed at the level of the scar. For the past 4 years, we have fixed the muscle in the fatty tissue 2 cm below the lower edge of the incision (Fig. 3) to avoid this

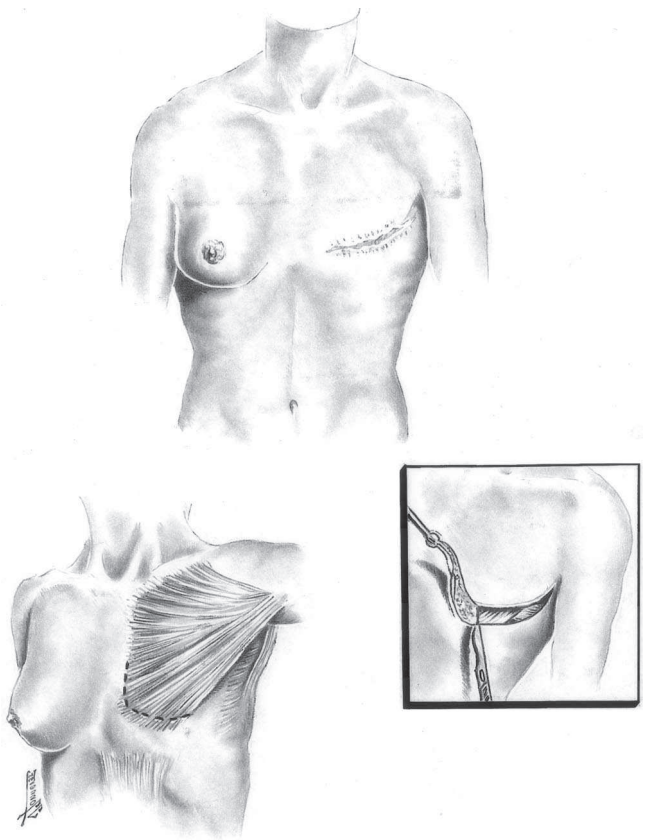

FIGURE 1. Mastectomy scar resection and detachment of the pectoralis major muscle from the sternum and sixth rib.

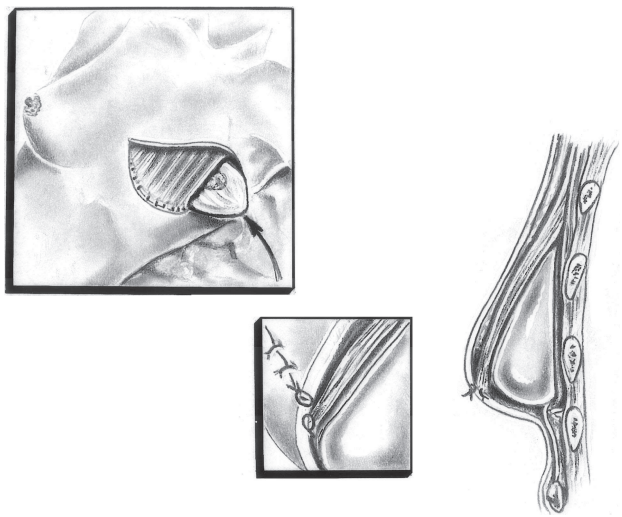

FIGURE 2. Suture of the pectoral muscle flap 2 cm below the cutaneous closure.

lumping effect. Lastly, cutaneous closure is undertaken with absorbable subcutaneous stitches of 3–0 and 4–0, and intradermal suturing is performed with 4–0 monofilament (Fig. 4).

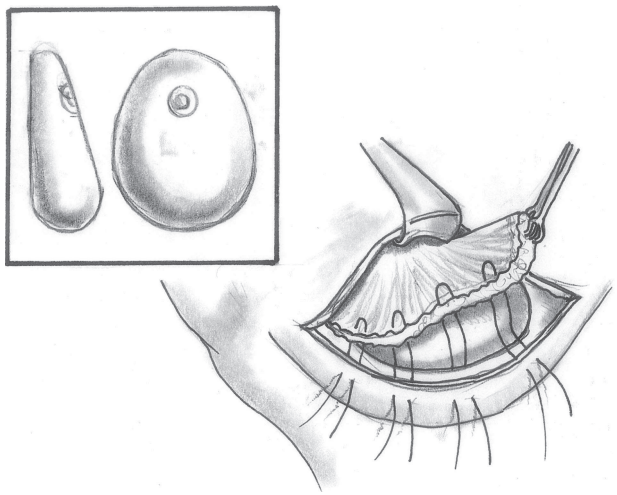

FIGURE 3. Transfixing stitches to hold the pectoralis major muscle.

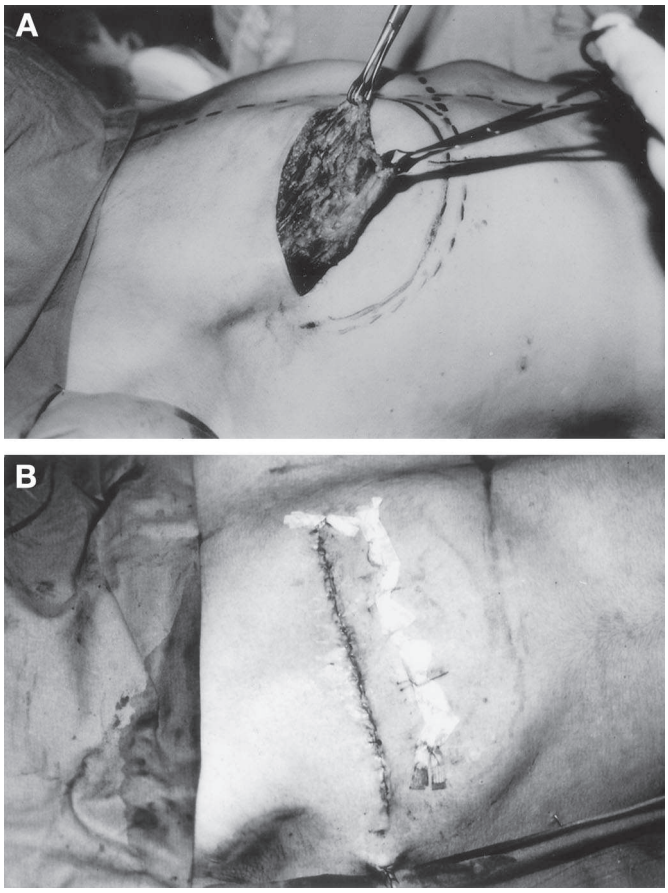

FIGURE 4. (**A**) Pectoral muscle flap detached from the sternum and sixth rib. (**B**) Cutaneous closure. Observe the fixation of the transfixing stitches without knotting using adhesive cutaneous sutures.

Expansion begins 15 days after the surgery, twice a week, until a 20% overexpansion % is achieved. Four months after surgery the expander is substituted with the permanent prosthesis. When placing the prosthesis it is important to avoid complete opening of the incision to avoid denervation of the lower segment of the pectoral muscle. Thus, only the most lateral part of the incision is opened outside the anterior axillary line.

During the postoperative period the patient should not wear a brassiere, which may elevate the expander. If pexia or reduction is performed in the healthy breast, a brassiere may be worn on this breast but not on the reconstructed breast. For this purpose we have designed a brassiere that does not raise the reconstructed side.

Patients

Seventy-five patients distributed into 4 groups according to the type of surgery required in the healthy breast underwent surgery: group 1, breast reconstruction without surgery of the healthy breast (n = 14); group 2, breast reconstruction and contralateral pexia (n = 22); group 3, breast reconstruction and contralateral breast reduction (n = 31); and group 4, breast reconstruction and augmentation of the contralateral breast (n = 8).

No significant complications were observed in any of the patients (Figs. 5 and 6).

DISCUSSION

The main problem with tissue expanders in the breast is that the expander becomes displaced cranially during expansion or during the postoperative period as a result of the use of subjective clothing (Fig. 7), making it difficult to achieve good reconstruction. Moreover, the reconstructed breast should have a drop shape, presenting an inclined plane on superior planes with good, rounded projection, particularly of the lower external quadrant, on the inferior planes. On placement of the expander with this technique, the 2 upper quadrants remain submuscular and the 2 lower quadrants are subcutaneous, thereby achieving optimum expansion.

Cranial coverage of the expander with muscle makes a more anatomic and natural shape, obtaining an adequate inclined plane at the level of the upper quadrants. In addition,

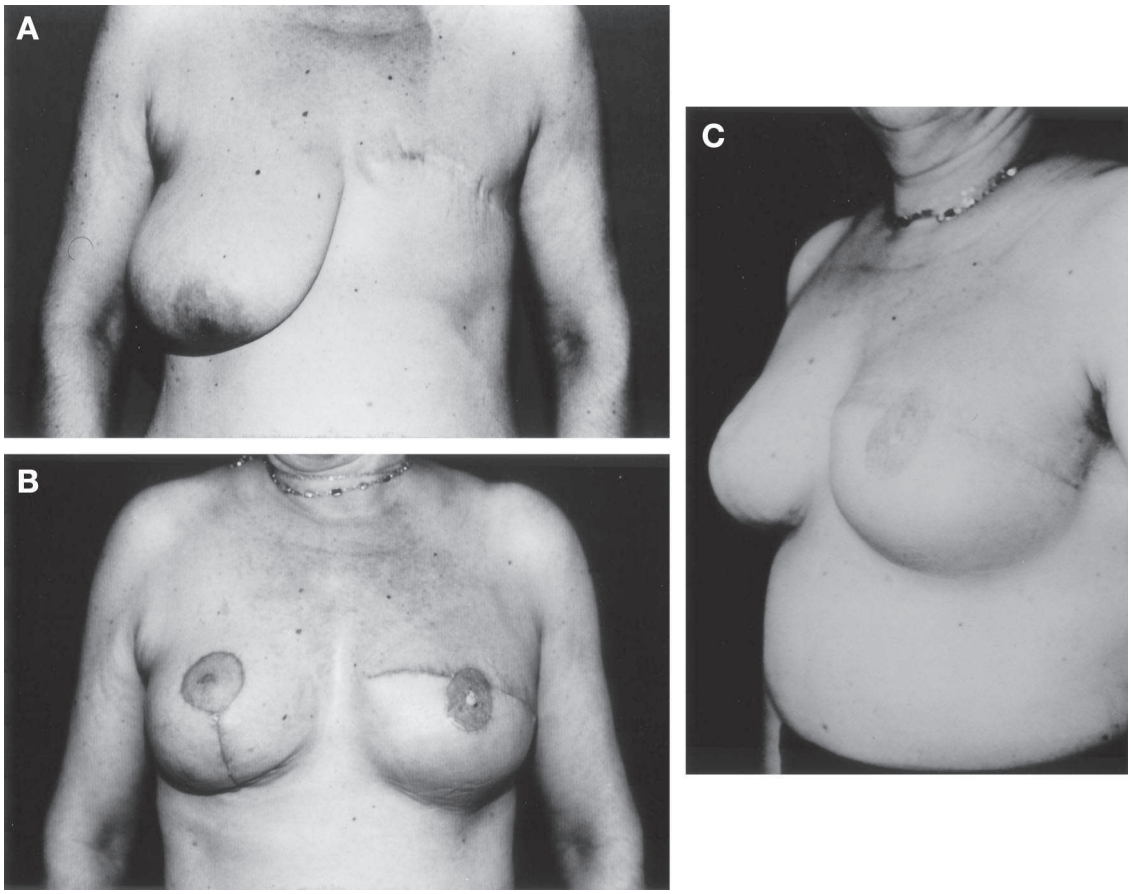

FIGURE 5. (**A**) Preoperative view of a 57-year-old patient with left mastectomy. (**B**) Postoperative view 1 year after reconstruction. (**C**) Oblique view.

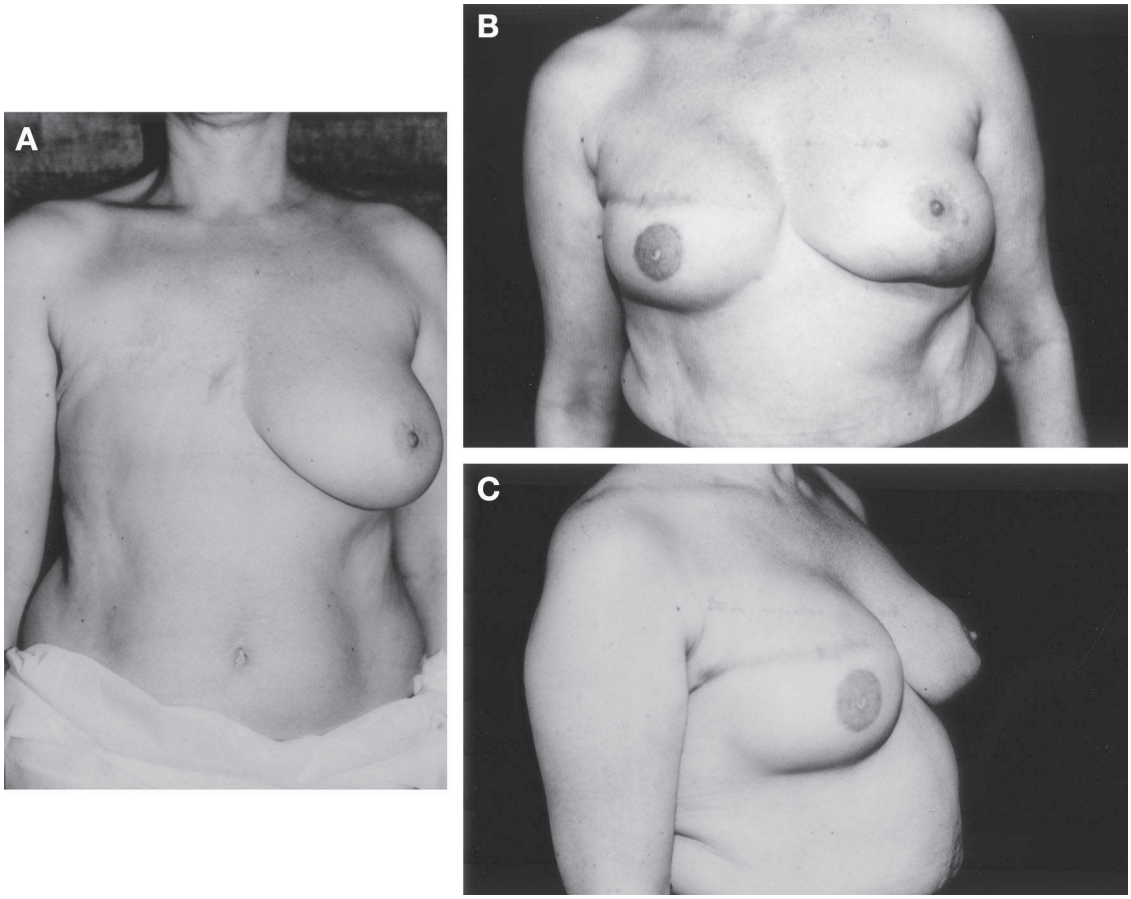

FIGURE 6. (**A**) Preoperative view of a 48-year-old patient with right mastectomy. (**B**) Postoperative view after 1 year of reconstruction. (**C**) Lateral oblique view.

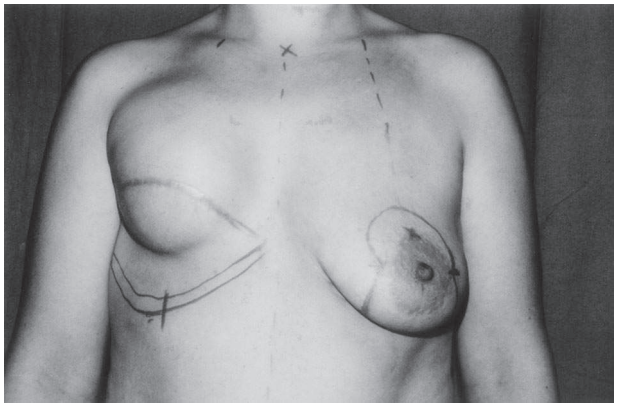

FIGURE 7. Cranial migration of the submuscularly placed tissue expander.

this allows correct expansion of the lower quadrants because the expander is placed subcutaneously at this level and does not have muscle resistance, thereby achieving maximum efficacy of the differential expansion. With the detachment of the lower half of the muscle, the expander is not raised on contraction of the muscle and this allows better expansion of the lower quadrants, providing a more aesthetic, round profile of the breast in its lower external quadrant. The pectoral muscle flap sutured 2 cm from the edge of the lower cutaneous flap protects the mastectomy wound, avoiding the possibility of expander extrusion.

We have performed this technique since 1993. In the beginning we sutured the muscle at the edge of the lower cutaneous flap. However, lumping was observed at the level of the scar and thus we decided to place transfixing stitches of the muscle to the dermal flap, but this occasionally led to a problem of cranial migration of the muscle. Currently we suture the free edge of the muscle 2 cm below the cutaneous edge of the lower flap. It is important to take into account that the pectoral muscle should not be detached above the fifth rib because this may also cause retraction.

The incision sectioning the muscle for placement of the prosthesis should not be long because this may denervate the distal portion of the muscle, leading to problems of extrusion of the prosthesis. We therefore recommend

that the incision in the mastectomy scar be placed as lateral as possible.

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