

One-Step Prepectoral Breast Reconstruction With Dermal Matrix—Covered Implant Compared to Submuscular Implantation: Functional and Cost Evaluation

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Abstract

The aim of this study was to compare the functional and economical outcomes of the prepectoral breast reconstruction (PPBR) versus the subpectoral one. PPBR entailed significantly lower postoperative pain and faster upper limb functional recovery than subpectoral procedure. Moreover, PPBR largely reduced the need for symmetrization. Therefore, PPBR was also economically advantageous over traditional implant reconstruction.

Background: The breast reconstructive subpectoral technique commonly leads to functional consequences. Recently, a new conservative prepectoral breast reconstruction (PPBR) technique was proposed and its surgical safety and aesthetic effectiveness proved. The aim of this prospective nonrandomized study was to compare the functional and economical outcomes of the PPBR procedure versus the subpectoral one. **Patients and Methods:** From February 2015 to September 2016, 86 patients underwent mastectomy with immediate implant-based reconstruction. Thirty-nine patients were assigned to group 1 and received prepectoral acellular dermal matrix—wrapped implant reconstruction. The remaining 45 patients were assigned to group 2 and received a subpectoral implant or tissue expander. We recorded the operating time, length of hospital stay, analgesic consumption, postoperative pain, upper limb function, esthetic satisfaction, and quality of life. Additional surgical procedures for reconstruction completion or contralateral operation for symmetrization were also recorded. **Results:** Compared to group 2 patients, group 1 patients showed less postoperative pain and faster upper limb functional recovery. Patients in group 1 also recorded a lower analgesic consumption and an earlier return to usual work. Moreover, the muscle-sparing technique improved aesthetic outcomes and largely reduced the need for symmetrization. **Conclusion:** Immediate breast reconstruction by using prepectoral muscle-sparing acellular dermal matrix—wrapped implant resulted in lower pain intensity and significant upper limb functional advantages compared to submuscular implant placement. Furthermore, when considering a series of ascertained benefits, PPBR is also economically advantageous, although future studies should better define its cost-effectiveness.

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Introduction

During the last 3 decades, breast cancer surgical treatment has been conservative, focusing on partial breast resections and axillary lymph node conservation. Nevertheless, in recent years, we have

observed a countertrend increase in the rate of total mastectomies as a result of concomitant causes, including better detection of multicentric tumors, widespread risk-reducing mastectomies in patients with genetic mutations, and improved quality of breast

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One-Step Breast Reconstruction

Figure 1 Examples of Asymmetry After Submuscular Implant Reconstruction



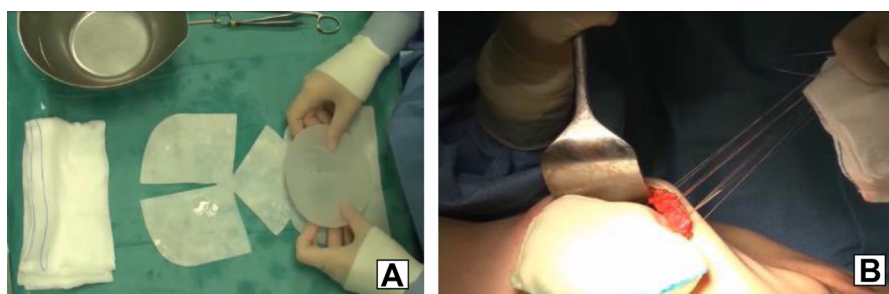
reconstruction.¹ Immediate breast reconstruction favorably affects quality of life (QoL) without influencing cancer recurrence or patient survival.²⁻⁴ Until recently, some muscular sacrifice was considered an unavoidable adverse effect of breast reconstruction after mastectomy. This was obvious not only in the majority of autologous flap-based procedures but also in implant reconstruction, which necessitates partial detachment of one or more muscular units to assure an adequate coverage of the prostheses or tissue expander. Many studies demonstrated that subpectoral implant positioning may cause prolonged postoperative pain with subjective and objective upper limb functional impairment due to pectoralis and serratus muscles surgical injuries, thus requiring physical rehabilitation.⁵⁻⁷ Despite this, 1-stage direct-to-implant (DTI) submuscular breast reconstruction gained widespread use as a result of the short duration of the procedure and its easiness to be learnt. However, this technique entails other drawbacks, including restricted choice in implant volume, frequent unnatural breast shape with unsatisfactory ptosis and contour deformities, and capsular contracture. Furthermore, breasts reconstructed with submuscular DTI almost always require surgical symmetrization of the contralateral mound (Figure 1). In contrast, 2-step reconstruction with

tissue expander and definitive implant (TE/I) may result in acceptable aesthetic results, but beyond requiring an analogous functional burden, it almost doubles the direct costs as a result of the second surgery required, and it is implicated in a far longer period of physical and emotional disability for the patients compared to single-stage procedures.⁸

The introduction of acellular dermal matrices (ADM) allowed an extension of the muscular pocket with a wider choice of implantable prosthetic volume and improved aesthetic results, but it did not substantially change the need for muscular recruitment and related patient discomfort. Collaterally, ADMs have confuted the dogma of total muscular coverage of the prosthesis, allowing it to be positioned in part subcutaneously. Consequently, the feasibility of a true muscle-sparing procedure with subcutaneous placement of a completely ADM-wrapped implant was recently assessed; it quickly achieved a high degree of aesthetic satisfaction.⁹⁻¹¹ However, the literature still lacks a reproducible demonstration of the physical advantages of this approach compared to the submuscular technique.¹²

The aim of this study was to evaluate the postoperative pain and the shoulder—arm functional impairment related to muscle-sparing

Figure 2 Surgical Steps of Prepectoral Breast Reconstruction. (A) Silicone Implant Is Wrapped With Rehydrated Acellular Dermal Matrix. (B) Implant Is Fixed to Pectoralis Major Fascia by 3-0 Absorbable Interrupted Stitches to Maintain Implant in Correct Position



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