

Review Article

Comparative outcomes of autologous and implant-based breast reconstruction techniques: evidenced-based perspectives

Santiago González Gómez^{1*}, Alan Amado Méndez Pérez², Karla Paola Guzman-Brito²,
Emmanuel Alejandro Saucedo Resendiz¹, Rafael Chávez Contreras³,
María Fernanda Páez Arteaga¹

¹Centro Médico Nacional del Noreste, IMSS, Monterrey, Nuevo León, México

²Hospital General de Zona, IMSS, Guadalupe, Nuevo León, México

³Hospital Civil de Guadalajara Fray Antonio Alcalde, Guadalajara, Jalisco, Mexico

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*Correspondence:

Dr. Santiago González Gómez,
E-mail: santigogomty@gmail.com

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ABSTRACT

Breast reconstruction techniques differ widely in their utilization of tissue, associated donor site morbidity, complication profiles, and patient-reported outcomes. Autologous options, such as the deep inferior epigastric perforator (DIEP) and transverse rectus abdominis myocutaneous (TRAM) flaps, are preferred for their superior long-term satisfaction, better aesthetic results, and lower complication rates, particularly in patients who have received radiotherapy. While implant-based reconstruction offers a less invasive and faster recovery alternative, it is associated with higher long-term complication rates and lower patient satisfaction. The choice of technique should consider individual patient factors, oncologic safety, and personal preferences, as the long-term quality of life and satisfaction are more closely linked to the reconstructive method than to the timing of surgery. Overall, autologous reconstructions tend to provide more durable, satisfying outcomes, emphasizing their role in personalized breast cancer care.

Keywords: Breast reconstruction, Autologous flap, DIEP flap, TRAM flap, Implant-based reconstruction, Long-term outcomes, Patient satisfaction, Complication profiles, Oncologic considerations

INTRODUCTION

Breast reconstruction techniques vary considerably in their use of tissue, donor site morbidity, complication profiles, and patient-reported outcomes. Among autologous options, the DIEP flap and the TRAM flap are both based on abdominal tissue but differ primarily in the amount of muscle harvested. The DIEP flap preserves the rectus abdominis muscle by dissecting out only the perforating vessels, leading to lower donor site morbidity, better preservation of abdominal wall function, and a reduced risk of bulge or hernia compared to TRAM flaps, which sacrifice some or all of the rectus muscle.¹⁻³ Muscle-sparing free TRAM flaps (MS-TRAM) serve as an

intermediate approach, preserving more muscle than traditional TRAM but less than DIEP. They offer similar reconstructive outcomes; however, there is a trend toward higher rates of abdominal weakness and bulging with MS-TRAM compared to DIEP.³

Patient satisfaction and aesthetic outcomes tend to be higher with autologous, abdominal-based reconstructions (DIEP and TRAM) relative to implant-based techniques. After adjusting for confounding factors, no significant difference in satisfaction has been observed between DIEP and TRAM flaps.⁴ Nonetheless, DIEP flaps are associated with higher abdominal physical well-being scores and fewer donor site complications than both pedicled or free TRAM flaps.¹ Moreover, the risk of major complications

is lower with DIEP flaps compared to two-stage tissue expander/implant (TE/I) reconstructions, especially in patients who receive adjuvant radiotherapy.⁵

Tissue expander/implant reconstruction is a widely used prosthetic approach that involves a staged process: initially, a tissue expander is inserted to gradually stretch the skin and soft tissue, followed by the definitive placement of a permanent implant once adequate expansion is achieved. This method offers several advantages, including the avoidance of donor site morbidity associated with autologous tissue transfer, shorter operative times, and a less invasive initial procedure. However, it is associated with higher long-term complication rates, especially in patients who undergo postoperative radiotherapy, which can increase the risk of capsular contracture, implant failure, and other issues. Additionally, compared to autologous reconstruction, patient satisfaction scores tend to be lower, particularly over the long term, due to factors such as the feel of the reconstructed breast, aesthetic outcomes, and the need for potential revision surgeries. Despite these limitations, tissue expander/implant reconstruction remains a suitable and effective option for many patients, particularly when surgical exposure or comorbidities make autologous procedures less feasible.^{4,5}

The term "dorsal flaps" is not standard in the literature; it is likely a misnomer for the latissimus dorsi flap, a well-established autologous option utilizing muscle and skin from the back. Among autologous reconstructions, abdominal-based flaps such as DIEP and TRAM tend to provide higher satisfaction and superior aesthetic outcomes compared to latissimus dorsi flaps.⁴

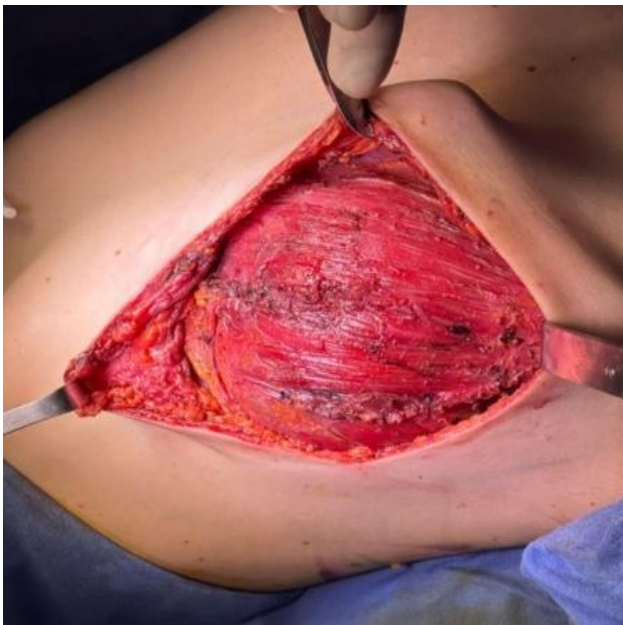


Figure 1: Placement of a retropectoral tissue expander in the right breast.



Figure 2: Latissimus dorsi flap plus placement of expander.



Figure 3: Breast reconstruction using a TRAM flap.

INDICATIONS FOR EACH TECHNIQUE

The selection of a breast reconstruction method depends on a combination of patient-specific factors, oncologic considerations, and planned adjuvant therapies. The main

techniques and their common indications are outlined below:

Implant-based reconstruction

This reconstructive approach, which includes both direct-to-implant (DTI) and tissue expander/implant (TE/I) strategies, is generally indicated for patients undergoing mastectomy for both therapeutic and risk-reduction purposes who possess sufficient soft tissue coverage, have not received prior chest wall irradiation, and prefer a shorter operative time with a quicker recovery process. It is particularly well-suited for women with smaller to moderate breast sizes, minimal ptosis, and those who wish to avoid the potential donor site morbidity associated with autologous tissue procedures. In cases where the patient has favorable breast anatomy—such as grade I or II ptosis, good skin quality, and adequate tissue perfusion—direct-to-implant reconstruction is often the preferred option. This approach allows for immediate reconstruction that maintains a breast size similar to the preoperative or contralateral side, offering benefits such as fewer surgeries and a more natural feel over time. Conversely, tissue expander/implant reconstruction is typically selected when the skin envelope is tight, fragile, or insufficient to accommodate a permanent implant initially. It allows gradual tissue expansion over weeks, providing better control over tissue expansion and positioning, especially in cases where initial skin laxity is limited. Overall, the choice between these strategies should be individualized based on patient anatomy, preferences, and clinical conditions, with a goal to optimize aesthetic results, minimize complications, and facilitate a swift return to daily activities.⁶⁻¹¹

Autologous tissue flap reconstruction

Options such as TRAM, DIEP, or latissimus dorsi (LD) flaps are typically indicated in patients with prior chest wall irradiation, compromised or poor soft tissue quality, or when implant-based reconstruction is contraindicated or has previously failed. These autologous tissue techniques are particularly advantageous in cases requiring larger volume reconstruction/where soft tissue deficits are substantial, such as after radical/salvage mastectomy procedures. They provide a more natural breast feel and appearance, owing to use of patient's own tissue which closely mimics natural breast characteristics. Additionally, autologous flaps can improve local tissue quality, enhance contour, and potentially reduce long-term complications associated with implants, making them an optimal choice for complex/challenging reconstructive scenarios.^{7,8} Patients with sufficient donor tissue who accept longer operative times and potential donor site morbidity are suitable candidates.

Oncoplastic techniques

These techniques are primarily indicated for partial breast reconstruction following breast-conserving surgery,

particularly in cases where the tumor-to-breast volume ratio is high, and a more conservative approach is desired. Volume displacement methods are especially beneficial for larger-breasted women; they utilize the remaining breast tissue to reshape and restore the breast contour by incorporating the excision site into a breast reduction or mastopexy pattern, thus achieving symmetry and satisfactory aesthetic outcomes. In contrast, volume replacement techniques—using local or distant flaps—are more appropriate when large resections are necessary in smaller breasts, or when local tissue is limited and cannot be used for reshaping. These options provide the necessary tissue to fill significant defects, restoring breast volume and contour without compromising the remaining breast tissue's aesthetic and functional integrity. Choice between displacement and replacement strategies should be individualized based on extent of resection, breast size, tissue availability, and patient preferences, with goal of achieving optimal oncologic and cosmetic results.^{7,12}

Nipple-sparing mastectomy with immediate reconstruction

This option is appropriate for carefully selected patients with early-stage disease, favorable tumor location, and adequate skin perfusion. Ideal candidates typically have minimal ptosis and prefer optimal aesthetic outcomes without compromising oncologic safety.^{6,10,11}

LONG-TERM OUTCOMES AND PATIENT-REPORTED MEASURES

Extensive studies including cohort analyses, prospective trials, and systematic reviews have evaluated the long-term results of breast reconstruction techniques. Overall, autologous tissue-based reconstruction—including abdominal flaps (DIEP and TRAM) and latissimus dorsi flaps—tends to yield higher long-term patient satisfaction and quality of life. BREAST-Q assessments consistently show superior scores in satisfaction, psychosocial, and sexual well-being for autologous procedures, with abdominal flaps (e. g., DIEP) often outperforming other methods.¹³⁻²⁰

While implant-based reconstructions are less invasive and involve shorter initial surgeries, they are associated with lower long-term satisfaction concerning breast aesthetics and overall well-being. Patients often experience higher rates of late complications, such as unplanned reoperations and readmissions, particularly in the setting of radiotherapy.^{1,8,9}

Autologous reconstruction, despite higher short-term complication rates and longer initial operative times, is linked to fewer long-term issues and secondary procedures. It may, however, result in reduced abdominal well-being due to donor site morbidity. Nonetheless, overall quality of life over time tends to favor autologous approaches.^{1,8,9}

Timing-whether immediate or delayed reconstruction-appears to have less impact on long-term satisfaction than the choice of the reconstructive method itself.

CONCLUSION

Breast reconstruction techniques encompass a diverse array of approaches, each with unique considerations relating to tissue utilization, donor site morbidity, complication profiles, and patient-reported outcomes. Autologous reconstruction methods, notably the DIEP flap, have gained prominence due to their favorable long-term results. These techniques involve transferring the patient's own tissue-typically from the abdomen-thereby avoiding the use of foreign implants. DIEP flaps offer significant advantages, including reduced donor site morbidity compared to TRAM flaps, as they preserve muscle function and minimize abdominal wall weakness. Long-term studies consistently demonstrate higher patient satisfaction, improved aesthetic outcomes, and enhanced quality of life with autologous tissue reconstructions, especially in cases involving postoperative radiotherapy, which can adversely affect implant-based options.

In contrast, implant-based reconstruction provides a less invasive alternative with shorter operative times, which may be preferred by patients seeking a quicker initial recovery or those with contraindications for lengthy surgeries. However, implants are associated with higher rates of long-term complications such as capsular contracture, implant rupture, or displacement, and often require additional revisions over time. Patient satisfaction with implant-based reconstruction tends to decline in the long term, particularly in patients who undergo radiotherapy, which increases the risk of complications and compromises aesthetic outcomes.

Individualized patient assessment remains essential when selecting the most appropriate reconstructive approach. Factors such as patient anatomy, comorbidities, previous abdominal surgery, oncologic treatment plans, and personal preferences should guide decision-making. Importantly, current evidence suggests that the timing of reconstruction-whether immediate or delayed-has less impact on long-term results than the chosen reconstructive modality itself. Overall, autologous tissue reconstruction generally yields higher long-term satisfaction and quality of life, especially in patients receiving radiotherapy, whereas implant-based reconstruction remains a suitable option for specific patient populations with particular needs, preferences, or contraindications. Tailored, multidisciplinary planning ensures optimal outcomes aligned with individual patient goals and clinical circumstances.

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REFERENCES

1. Erdmann-Sager J, Wilkins EG, Pusic AL, Ji Q, Hamill JB, Kim HM, et al. Complications and Patient-Reported Outcomes After Abdominally Based Breast Reconstruction: Results of the Mastectomy Reconstruction Outcomes Consortium Study. *Plastic Reconstruct Surg.* 2018;141(2):271-81.
2. Zoghbi Y, Gerth DJ, Tashiro J, Golpanian S, Thaller SR. Deep Inferior Epigastric Perforator Versus Free Transverse Rectus Abdominis Myocutaneous Flap: Complications and Resource Utilization. *Ann Plastic Surg.* 2017;78(5):516-20.
3. Nahabedian MY, Tsangaris T, Momen B. Breast Reconstruction With the DIEP Flap or the Muscle-Sparing (MS-2) Free TRAM Flap: Is There a Difference? *Plastic Reconstruct Surg.* 2005;115(2):436-44.
4. Yueh JH, Slavin SA, Adesiyun T, Theodore TN, Shiva G, Donald JM, et al. Patient Satisfaction in Postmastectomy Breast Reconstruction: A Comparative Evaluation of DIEP, TRAM, Latissimus Flap, and Implant Techniques. *Plastic Reconstruct Surg.* 2010;125(6):1585-95.
5. Lee KT, Kim J, Jeon BJ, Jai KP, Bang SI, Goo-Hyun M. Longitudinal Analysis of Long-Term Outcomes of Abdominal Flap-Based Microsurgical Reconstruction and Two-Stage Prosthetic Reconstruction. *Sci Rep.* 2023;13(1):4062.
6. Colwell AS, Taylor EM. Recent Advances in Implant-Based Breast Reconstruction. *Plastic Reconstruct Surg.* 2020;145(2):421e-32.
7. Petit JY, Rietjens M, Lohsiriwat V, Piercarlo R, Cristina G, De Lorenzi F, et al. Update on Breast Reconstruction Techniques and Indications. *World J Surg.* 2012;36(7):1486-97.
8. Petit J, Rietjens M, Garusi C. Breast Reconstructive Techniques in Cancer Patients: Which Ones, When to Apply, ¿Which Immediate and Long Term Risks? *Crit Rev Oncol/Hematol.* 2001;38(3):231-9.
9. Colwell AS, Christensen JM. Nipple-Sparing Mastectomy and Direct-to-Implant Breast Reconstruction. *Plastic Reconstruct Surg.* 2017;140(5S):44S-50.
10. Rocco N, Catanuto GF, Accardo G, Nunzio V, Paolo C, Michela C, et al. Implants Versus Autologous Tissue Flaps for Breast Reconstruction Following Mastectomy. *Cochrane Database Systemat Rev.* 2024;10:CD013821.
11. Thai JN, Sodagari F, Colwell AS, Winograd JM, Margarita VR, Hagar M, et al. Multimodality Imaging of Postmastectomy Breast Reconstruction Techniques, Complications, and Tumor Recurrence. *Radiographics.* 2024;44(5):e230070.
12. Thiessen FEF, Tjalma WAA, Tondur T. Breast Reconstruction After Breast Conservation Therapy for Breast Cancer. *Eur J Obstet Gynecol Reproduct Biol.* 2018;230:233-8.
13. Johnson L, White P, Jeevan R, Browne J, Gulliver-Clarke C, O'Donoghue J, et al. Long-Term Patient-

- Reported Outcomes of Immediate Breast Reconstruction After Mastectomy for Breast Cancer: Population-Based Cohort Study. *Brit J Surg.* 2023;110(12):1815-23.
14. Nelson JA, Allen RJ, Polanco T, Shamsunder M, Patel AR, McCarthy CM, et al. Long-Term Patient-Reported Outcomes Following Postmastectomy Breast Reconstruction: An 8-Year Examination of 3268 Patients. *Anna Surg.* 2019;270(3):473-83.
 15. Pusic AL, Matros E, Fine N, Edward B, Gayle MG, Jennifer BH, et al. Patient-Reported Outcomes 1 Year After Immediate Breast Reconstruction: Results of the Mastectomy Reconstruction Outcomes Consortium Study. *J Clin Oncol.* 2017;35(22):2499-506.
 16. Ren Y, Yu Y, Xu K, Li Z, Wang X. Meta-analysis of immediate implant-based breast reconstruction versus autologous breast reconstruction in the setting of PMRT. *Aesthet Plastic Surg.* 2024;48(10):1940-8.
 17. Esparham A, Shoar S, Whittington J, Shafae Z. National trends and in-hospital outcomes for immediate implant-based versus autologous-based breast reconstruction: a propensity score-matched analysis. *Ann Surgical Oncol.* 2025;32(2):985-92.
 18. Muntean MV, Pop IC, Ilies RA, Pelleter A, Vlad IC, Achimas-Cadariu P. Exploring the Role of Autologous Fat Grafting in Implant-Based Breast Reconstruction: A Systematic Review of Complications and Aesthetic Results. *J Clin Med.* 2025;14(12):4073.
 19. Sungkar A, Yarso KY, Nugroho DF, Wahid DI, Permatasari CA. Patients' Satisfaction After Breast Reconstruction Surgery Using Autologous versus Implants: A Meta-Analysis. *Asian Pacific J Cancer Prevention.* 2024;25(4):1205.
 20. Cho MJ, Schroeder M, Flores Garcia J, Royfman A, Moreira A. The Current State of the Art in Autologous Breast Reconstruction: A Review and Modern/Future Approaches. *J Clin Med.* 2025;14(5):1543.

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