

Review article

Physical and psychological impact of immediate and delayed breast reconstruction following mastectomy

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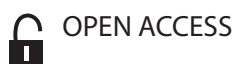
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Impacto físico y psicológico de la reconstrucción mamaria inmediata y tardía tras mastectomía

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Abstract

Breast cancer is currently a public health problem due to the sustained increase in its incidence worldwide and regionally. Breast reconstruction has emerged as a surgical alternative for women who have undergone a mastectomy, helping to alleviate the physical and psychological consequences that impact their quality of life. This literature review explores the various breast reconstruction techniques, as well as the effects associated with each, and the significant differences in aspects such as chronic pain, mobility, sexuality, functionality, and emotional and psychological well-being. The main objective of this review is to analyze the evidence on the physical and psychological effects of immediate breast reconstruction techniques compared to delayed reconstruction. A search was conducted in PubMed, Scielo, Google Scholar, and Hinari. A total of 46 articles were selected that met the following inclusion criteria: full-text articles with available references; peer-reviewed publications in Spanish and English published between 2020 and 2025; and search terms including: breast cancer, breast reconstruction, psychological effects, mastectomy, quality of life, and mental health, using the Boolean operator "psychological impact" OR "physical effects." It was concluded that both immediate and delayed breast reconstruction offer similar benefits at different stages of patient treatment, depending on the patient's condition. This procedure is considered a fundamental part of care for post-mastectomy patients, ensuring a multidisciplinary approach and inclusive health policies that provide equal opportunities for patients.

Keywords

Breast Reconstruction, Quality of Life, Mental Health, Reconstructive Surgical Procedures, Breast Neoplasms.

Resumen

El cáncer de mama constituye en la actualidad, un problema de salud pública debido al incremento sostenido de su incidencia a nivel mundial y regional. La reconstrucción mamaria surge como alternativa quirúrgica para las mujeres que han sido sometidas a una mastectomía, mitigando las secuelas físicas y psicológicas que impactan en su calidad de vida. Por medio de esta revisión bibliográfica se exploran las distintas técnicas de reconstrucción mamaria, así como los efectos asociados a cada una, y las diferencias importantes en aspectos como el dolor crónico, movilidad, sexualidad, funcionalidad, bienestar emocional y psicológico. El objetivo principal de esta revisión es analizar la evidencia sobre los efectos físicos y psicológicos de las técnicas de reconstrucción mamaria inmediata, comparada con la tardía. Se realizó una búsqueda en PubMed, Scielo, Google Académico e Hinari. Se seleccionaron 46 artículos que cumplieron criterios de selección como: artículos a texto completo, con referencias disponibles, publicaciones arbitradas en español e inglés publicadas de 2020 a 2025, con términos de búsqueda: cáncer de mama, reconstrucción de mama, efectos psicológicos, mastectomía, calidad de vida y salud mental, con el operador booleano "psicológico impact" OR "efectos físicos". Concluyendo que, tanto la reconstrucción mamaria inmediata como tardía, ofrecen beneficios similares en diferentes momentos del tratamiento de las pacientes dependiendo su condición, considerándose este procedimiento parte fundamental del manejo en pacientes posmastectomía, para garantizar un abordaje multidisciplinario y políticas de salud inclusivas que permitan igualdad de oportunidad para las pacientes.

Palabras clave

Reconstrucción Mamaria, Mastectomía, Calidad de Vida, Salud Mental, Cirugía Reconstructiva.

Introduction

Globally, 19 million new cases of cancer were identified in 2020; breast cancer was the most commonly diagnosed, with an estimated 2.3 million new cases and an estimated ten million deaths.¹ In Latin America, breast cancer is a major public

health problem, as it is the most common cancer and the leading cause of death, with 200 000 new cases and more than 52 000 deaths per year.² In El Salvador, by 2020, breast cancer had become the most common cancer in the country, with 2767 cases;³ while in 2022, 2120 new cases were diagnosed.⁴

Various treatments are available for breast cancer, such as chemotherapy, radiation therapy, immunotherapy, and surgery; however, mastectomy is considered the therapeutic option par excellence.⁵ This surgical technique involves the complete removal of breast tissue, which has repercussions on patients' biopsychosocial well-being by altering their overall self-perception and negatively affecting their relationships with their support network, their work environment, and even with themselves.⁶

Breast reconstruction offers a surgical solution to the sequelae resulting from mastectomy, given that patients undergoing this procedure face challenges that affect their quality of life, such as depression, anxiety, difficulty accepting their self-image, and post-surgical stigmatization.⁷

Among the factors affecting the quality of life of women after mastectomy, the impact on their emotional well-being stands out.⁸ Therefore, it is essential to recognize the importance of a multidisciplinary approach from the moment the treatment decision is made.⁹ Breast reconstruction helps patients regain their body identity, confidence, self-esteem, and mental health; however, it is a treatment that is not accessible to all. A study based on data from the SEER (Surveillance, Epidemiology, and End Results) program conducted by the U.S. National Cancer Institute reported that only 41.6 % of patients who underwent mastectomy received breast reconstruction.¹⁰

A search was conducted in PubMed, Scielo, Google Scholar, and Hinari for studies in Spanish and English published between 2020 and 2025. The following search terms were used: breast cancer, breast reconstruction, psychological effects, mastectomy, quality of life, and mental health. These were combined with Boolean operators to generate search queries such as: "psychological impact" OR "physical effects." Articles were selected if they were available in full text, had references, were published in peer-reviewed journals, and were no more than five years old, resulting in a final sample of 35 articles.

Therefore, the primary objective of this research is to identify the physical and psychological effects of immediate and delayed breast reconstruction techniques on the daily lives of post-mastectomy patients as described in recent literature, in order to provide holistic care and ensure the physical and emotional well-being of patients,¹¹ by providing data on quality of life to support a conscious and informed choice regarding the potential long-term impact of each surgical procedure.¹²

Discussion

Breast reconstruction techniques in posmastectomy

Women Breast reconstruction is a widely used technique following mastectomy that is associated with a better quality of life, psychosocial well-being, and body image satisfaction among patients.¹³

Breast reconstruction techniques are classified as autologous reconstruction using the patient's own tissue, and simple reconstruction using implants. Autologous reconstruction techniques include flap reconstruction using the latissimus dorsi muscle, the transverse rectus abdominis myocutaneous (TRAM) flap, the gracilis muscle flap, or the gluteal area flap.¹⁴

Autologous techniques offer long-term benefits such as a natural appearance and preserved sensation. The TRAM flap uses muscle from the rectus abdominis, which, in addition to providing a natural appearance, avoids complications associated with breast implants, such as inflammatory reactions or muscle contracture.¹⁵ Another widely described technique, and one even considered the gold standard, is the deep inferior epigastric artery (DIEP) perforator flap, in which, during dissection, a vessel from a perforating branch of the inferior abdominal wall artery is used as the pedicle, without the need to resect the rectus abdominis muscle. Unlike the TRAM flap, this technique preserves the integrity of the rectus abdominis muscle and prevents tissue destruction, thereby reducing morbidity at the donor site and the risk of complications such as hernias or abdominal wall weakness. Furthermore, it allows for better preservation of abdominal function and offers favorable aesthetic results by using autologous tissue, contributing to a more functional and natural recovery.¹⁶ Additionally, there are techniques using superior gluteal artery perforator (SGAP) flaps and anterolateral thigh (ALT) flaps with low complication rates.¹⁷

Implants are the most widely used breast reconstruction technique worldwide.¹⁸ Depending on the implant's placement, there are prepectoral, subpectoral, and dual-plane implants. The prepectoral implant involves filling the space between the pectoralis major muscle and the skin flap from the mastectomy,¹⁹ whereas the subpectoral implant is placed between the pectoralis major muscle and the chest wall.²⁰ On the other hand, the dual-plane implant involves partial placement of the implant beneath the pectoralis major muscle, using an acellular dermal matrix for support at the

inferior pole. Recent evidence has shown that reconstruction using a prepectoral implant has complication rates similar to those of the subpectoral approach, with differences in specific outcomes such as reduced animation deformity.²¹

Likewise, breast reconstruction techniques can be classified as immediate (a single-stage procedure with a definitive implant), staged (involving the placement of a temporary tissue expander), and delayed (performed some time after mastectomy). The immediate technique is performed at the same time as the mastectomy and is associated with better aesthetic outcomes and improved psychosocial well-being for patients, whereas the delayed technique is typically performed six to 12 months after mastectomy.²²

During the immediate surgical technique, the breast surgeon begins the mastectomy by creating the superior skin flap and proceeding to dissect the breast tissue from the superior pole to the areola (including the fascia), stopping the dissection at the retroareolar area and the fifth intercostal space; At this point, the plastic surgeon incises the pectoralis major muscle parallel to its fibers and creates the retromuscular pocket using digital dissection toward the upper portion, then laterally and inferiorly, completing the dissection with blunt retractors, a light source, and an electrosurgical unit. Once the pocket has been created, a retromuscular drain is inserted, and either the expander or the implant is placed. The breast surgeon then rejoins the procedure to complete the total mastectomy.²³ On the other hand, for delayed reconstruction, the various surgical techniques already described (prosthesis, autologous tissue, or a combination of both) may be used; this is considered a good alternative for patients whose priority is adjuvant radiation therapy following mastectomy.²⁴

Physical effects of immediate and delayed breast reconstruction techniques on the daily lives of postmastectomy patients

The impact on the quality of life of women who undergo breast reconstruction begins the moment they are first diagnosed: Chapell A, *et al.*, described in their 2020 study that approximately 60 % of women who have undergone a mastectomy suffer from Post-Mastectomy Pain Syndrome (PMPS), a term first coined in 2016, which the International Association for the Study of Pain (IASP) defines as chronic pain in the anterior chest, axilla, and arm that occurs

following a mastectomy or quadrantectomy and persists for more than three months after surgery.²⁵

When a mastectomy is performed, the risk of nerve injury can lead to cortical changes associated with postoperative neuropathic pain,²⁶ a factor linked to overall well-being, as symptoms affecting the upper arm (lymphedema, tingling, pain, and stiffness) can result in reduced functionality and, in turn, a lower quality of life. According to a meta-analysis published by Kannan P, *et al.*, interventions such as physical exercise may offer benefits in managing pain and improving quality of life in women with PMPS.²⁷ Persistent neuropathic pain can manifest as phantom breast syndrome, a condition in which patients experience a sensation of residual breast tissue; this may include both non-painful sensations and pain, discomfort, itching, paresthesias, and throbbing in the phantom breast. This condition can begin even up to a year after surgery and persist for several more years, affecting quality of life through the combined impact of physical disability including pain during daily activities (both at home and at work) and emotional distress.²⁸

Complications associated with delayed reconstruction typically include pain in the arm, shoulder, and the site from which the flap was harvested, which in turn correlates with limited range of motion in the limb; this complication occurs in 40 % to 50 % of patients who undergo reconstruction using autologous tissue.²⁹ In the systematic review by Alves AS *et al.*, which evaluated 5784 patients, it was reported that immediate DIEP breast reconstruction was associated with a lower likelihood of healing problems (OR 0.57; 95 % CI 0.41-0.77; $p = 0.0003$), without a significant change in the risk of developing surgical complications such as hematomas or seromas, compared with delayed breast reconstruction.³⁰ On the contrary, in a retrospective cohort study conducted by Joukainen *et al.*, which evaluated 850 mastectomy patients who subsequently underwent reconstruction using DIEP, latissimus dorsi flap, implant, or gracilis musculocutaneous flap, it was observed that immediate reconstruction was not significantly associated with a higher rate of postoperative complications overall. However, the rate of reoperations was higher in the immediate reconstruction group (26 %) compared to the delayed reconstruction group (16 %). The complications evaluated included surgical site infection, skin necrosis, hematomas, seromas, and reoperations requiring implant removal.³¹

In an article by Moffett T, *et al.*, it was determined that between 20 % and 40 % of women who undergo breast surgery experience chronic pain as a clinically significant complication that can significantly impact patients' quality of life. This condition is defined as persistent pain when it lasts longer than three months following the surgical procedure. Among the pathophysiological mechanisms involved are peripheral nerve injury, particularly of the intercostal and intercostobrachial nerves, as well as the formation of neuromas, secondary fibrosis, and nerve entrapment.³²

Similarly, according to Lang A, *et al.*, after studying 50 women, 25 who underwent post-mastectomy reconstruction and 25 who underwent mastectomy alone, because women who have undergone mastectomy adopt a kyphotic posture, this could cause the anterior wall muscles to tense, the posterior muscles to stretch, and lead to possible shortening and weakness of the serratus anterior. Consequently, the trapezius muscle may attempt to compensate to maintain upward and internal rotation of the scapula; the overactivation and continuous, prolonged stiffness of the trapezius causes a muscular imbalance that could contribute to an increased risk of rotator cuff disease.³³

In a study conducted by Rogowsky L, *et al.*, 118 women who underwent mastectomy with immediate alloplastic reconstruction were evaluated; it was reported that 52.5 % of the patients experienced chronic pain in the chest, armpit, arm, or side of the affected side following surgery. Among the group that experienced chronic pain, the severity was rated by most patients as 3.1 on a scale where zero represents "no pain" and 11 represents "worst pain." Furthermore, it was found that chronic pain interferes with patients' daily lives, primarily in areas such as sleep, mood, and the ability to perform work-related activities; however, only 5.9 % of the participants rated the interference of pain on sleep with scores higher than eight on a scale of zero to ten.³⁴

Immediate breast reconstruction is associated with better aesthetic outcomes. Furthermore, when performed at the same time as the mastectomy, it reduces the number of surgical procedures. On the other hand, delayed reconstruction involves additional surgeries and a prolonged period without reconstruction, which can affect patients' quality of life and body image. The most common physical effects that may be linked to reconstruction, regardless of whether it was immediate or delayed, include chronic pain, limited mobility of

the shoulder joint on the affected side, and loss of sensation, all of which may be directly related to patients' quality of life and daily activities.³⁵

Psychological effects of immediate and delayed breast reconstruction techniques on the daily lives of posmastectomy patients

In post-mastectomy patients, the loss of a body part associated with femininity, such as the breast, can lead to feelings of insecurity, anxiety, sadness, and even depression.³⁶ A systematic review conducted by Nikita Roy *et al.*, evaluated fourteen articles that compared the psychological effects of immediate vs. delayed breast reconstruction. Four of these studies showed that patients who underwent immediate reconstruction experienced fewer psychological consequences, such as anxiety and depression, compared to those who underwent delayed reconstruction, while the remaining studies found no significant differences.³⁷

A literature review conducted by Quimbayo, Jiménez, and Soto found that body image perception impacts sexual interaction and performance in post-mastectomy women.³⁸ Likewise, in this particular study, it was observed that the majority of women in the sample who underwent the procedure showed an altered self-image, recalling negative feelings when looking in the mirror.³⁹

There are various tools for assessing patient satisfaction following a medical or surgical procedure. The BREAST Q is a specific tool used following breast augmentation, reduction, or reconstruction surgery. The questionnaire's questions are designed to assess quality of life, psychological and physical effects, sexual well-being, and satisfaction. The questionnaire uses a scale from zero to 100 for each question, where zero represents the lowest level of satisfaction and 100 the highest. The parameters assessed by the tool are: physical well-being, psychosocial well-being, sexual well-being, satisfaction with the surgical outcome, aesthetic satisfaction with the breast, satisfaction with preoperative information, satisfaction with the surgeon, satisfaction with the medical team, and satisfaction with the administrative staff.⁴⁰

In turn, in a prospective study conducted by Stana Pačarić, *et al.*,⁷⁹ patients diagnosed with breast cancer who underwent mastectomy and breast reconstruction were evaluated; it was found that patients who underwent mastectomy followed by breast reconstruction had better outcomes in

terms of quality of life, physical well-being, and psychological well-being compared to patients who did not undergo breast reconstruction.⁴¹ However, when comparing the timing of reconstruction, the evidence is less conclusive. Kuhlefeldt C, *et al.*, conducted a cross-sectional study in a population of 338 women who underwent immediate or delayed breast reconstruction and assessed quality of life using validated instruments such as the BREAST-Q. They found no significant differences in psychosocial and sexual well-being or in body image satisfaction between the two groups, suggesting that the timing of reconstruction does not have a decisive influence on the outcomes perceived by patients.⁴²

Furthermore, in a meta-analysis conducted by Juliano Sbalchiero *et al.*, which assessed "post-surgical satisfaction" and "physical well-being" using the BREAST-Q questionnaire among 248 women who underwent a mastectomy followed by immediate breast reconstruction, compared with 362 whose breast reconstruction was not immediate, significantly higher scores were obtained in the first group.⁴³

Furthermore, sexual dysfunction is an important component of quality of life in women who have undergone a mastectomy, which is negatively influenced by depressive disorders and body image issues associated with the loss of the female body's physical integrity following the surgical procedure.⁴⁴ In a study conducted by Cassia Vieira S, *et al.*, which compared sexual well-being using the Female Sexual Function Index (FSFI), a tool that assesses self-reported sexual function, among women who underwent mastectomy without reconstruction, women who underwent mastectomy with immediate reconstruction, and a control group that did not undergo any surgical procedure. It was found that women who had undergone immediate reconstruction (median 21.9) had higher scores than post-mastectomy women without breast reconstruction (median 15.4) and scores similar to those of the control group (median 23.6). However, the authors note that the results may be influenced by various factors, such as active disease, antidepressant treatment, tumor characteristics, and adjuvant therapies such as chemotherapy or hormone therapy.⁴⁵ In a study conducted by Espinoza *et al.*, which evaluated 23 women who had undergone mastectomy with reconstruction and 23 women who had undergone mastectomy without reconstruction, it was found that the group of women with reconstruction had higher median scores on the BREAST-Q questionnaire in the following areas: satis-

faction with the appearance of the breast (53.13 vs. 42; $p = 0.046$), physical well-being (86.09 vs. 79.48; $p = 0.088$), and post-mastectomy sexual well-being (53.96 vs. 37.44; $p = 0.029$).⁴⁶ Matros *et al.*, encompass the aspects mentioned above under the term "Financial Toxicity," which examines the multidimensional impact, primarily in terms of material expenses (debt), psychological response (anxiety and poor quality of life), and compensatory mechanisms (missed medical appointments or discontinuation of medications), on the daily lives of patients and their families. With regard to women who have undergone post-mastectomy reconstruction, the institution where the treatment is performed and the attending physician must be taken into account so that the combined efforts have a meaningful impact on the patients' lives.⁴⁷

Conclusion

In a social context where the concept of the female image is influenced by specific standards, the loss of one or both breasts can cause a disruption in patients' physical and emotional well-being, with repercussions on their work, support network, sexual well-being, and self-image. Both immediate and delayed breast reconstruction offer benefits to the quality of life of post-mastectomy patients; however, there are differences in specific domains. There is no consistent evidence to suggest that immediate reconstruction is associated with better outcomes in psychosocial aspects such as self-esteem, body image perception, and sexual well-being.

On the other hand, delayed reconstruction has not shown conclusive differences in the incidence of postoperative complications compared to immediate reconstruction. The available evidence suggests that both techniques may be associated with physical effects such as chronic pain, functional limitations, and sensory disturbances, without establishing a clear superiority of one technique over the other. On the other hand, in the psychological realm, there is a tendency to achieve better outcomes with immediate reconstruction compared to delayed reconstruction. For this reason, the timing of reconstruction must be tailored to the individual, taking into account clinical conditions, patient preferences, and resource availability, in order to optimize and achieve the best physical and psychological outcomes through a multidisciplinary approach. For this reason, breast reconstruction as an option to reduce the negative impact is an increasingly popular alternative,

as it can be performed either immediately or at a later date. The latter is used primarily for women who must undergo adjuvant radiation therapy. Furthermore, various surgical techniques are available

that aim to achieve the best aesthetic and functional outcomes, thereby positively supporting the adaptive process women face after breast cancer. Therefore, it is imperative that women with this diagnosis receive comprehensive care, as the chain of effects begins from the moment the diagnosis is first made. While it is true that no significant difference has been demonstrated between the physical or psychological effects of immediate vs. delayed reconstruction, the studies reviewed highlight the importance of considering the impact of the surgical procedure on patients' quality of life. Therefore, breast reconstruction should not be evaluated solely from an aesthetic standpoint, as the reviewed evidence demonstrates its relationship to psychological aspects such as body image, personal satisfaction, and emotional well-being following mastectomy.

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