

# Beyond Mastectomy: The Incidence of Subsequent Aesthetic Procedures after Mastectomy with and without Breast Reconstruction

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**Background:** Mastectomy poses significant challenges to a woman's body image and psychological well-being, and breast reconstruction plays a pivotal role in post-operative quality of life. Following breast reconstruction, many patients choose to have subsequent aesthetic procedures. Data on the prevalence of such subsequent aesthetic interventions are lacking in the literature. The aim of this study was to analyze trends in aesthetic procedures in patients following mastectomy with and without breast reconstruction.

**Methods:** The PearlDiver database was queried within its capabilities for patients who underwent mastectomy with and without breast reconstruction, and a variety of aesthetic procedures after mastectomy. Aesthetic procedure rates were compared between cohorts.

**Results:** We identified 365,525 mastectomy patients: 282,815 without reconstruction and 82,710 with reconstruction. In total, 609 patients with reconstruction and 329 without underwent subsequent aesthetic procedures. The rate of aesthetic procedures was higher in the reconstruction group (0.7%) compared with the nonreconstruction group (0.1%;  $P < 0.001$ ).

**Conclusions:** Patients who chose to have breast reconstruction after mastectomy underwent significantly more subsequent aesthetic procedures compared with those who chose mastectomy alone. Our findings provide insights on the prevalence of aesthetic procedures in postmastectomy patients, highlighting the potentially longitudinal nature of the reconstructive and aesthetic journey beyond the index oncologic procedure. Further research is needed to address motivations for such procedures as well as patient-reported outcomes and satisfaction. (*Plast Reconstr Surg Glob Open* 2024; 12:e5947; doi: [10.1097/GOX.0000000000005947](https://doi.org/10.1097/GOX.0000000000005947); Published online 3 July 2024.)

## INTRODUCTION

The journey from breast cancer diagnosis or discovery of genetic predisposition to breast cancer to postmastectomy recovery is multifaceted, involving not only the removal of breast tissue but also the restoration of physical integrity and psychological well-being. Mastectomy,

although a cornerstone of breast cancer treatment and prevention, has profound implications on a woman's body image and sense of self.<sup>1,2</sup> Breast reconstruction is pivotal in mitigating these psychosocial sequelae, with evidence suggesting it plays a crucial role in improving postoperative quality of life.<sup>3</sup> However, the path to recovery often extends beyond the primary oncologic and/or reconstructive procedure(s), and many patients seek additional aesthetic procedures to optimize their cosmetic outcomes. This pursuit of further refinement underscores an ongoing process of physical and psychological rehabilitation, yet data on these additional procedures are sparse in the literature.

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There are well-known studies concluding a preferential tendency of women to choose autologous techniques over alloplastic breast reconstruction related to patient satisfaction, major complications, and readmissions.<sup>4,5</sup> The intricacies of reconstructive choices are complicated by adjunctive treatments, such as chemotherapy<sup>6,7</sup> and radiation,<sup>8,9</sup> as well as patient-specific factors and other comorbidities, such as obesity.<sup>10,11</sup> Improved procedural and satisfaction outcomes may be linked to surgical innovation, such as the incorporation of acellular dermal matrices and other tissue scaffolds<sup>5</sup> or autologous fat grafting. There remains a gap in the literature around the prevalence of aesthetic procedures sought after breast reconstruction. We aimed to analyze trends of aesthetic interventions in patients who have undergone mastectomy with and without breast reconstruction.

## METHODS

### Database and Query Design

The PearlDiver patient records database and healthcare data analytics platform (PearlDiver, Inc., Colorado Springs, Colo.) was used for data extraction. This Health Insurance Portability and Accountability Act-compliant, de-identified database is composed of insurance claims data from 150 million patient records from January 2010 to May 2022. Records are derived from International Classification of Diseases 9 and 10 diagnosis codes, International Classification of Diseases 9 and 10 procedure codes, Current Procedural Terminology (CPT) codes, National Drug Codes, and prescription groupings. Claims data are gathered from all US states and territories, and from all payor types, including commercial insurance, Medicare, Medicaid, and self-pay. The data are verified upon integration into the database and through subsequent quarterly audits and internal reviews. Raw data available from PearlDiver are limited to the following: age, date, drug group, field number (primary, secondary, tertiary, etc.), gender, length of stay, physician specialty, physician national provider identifier, plan type, region, service location, state, and zip code. We used a query strategy using CPT codes to identify cohorts of patients who underwent mastectomies, reconstructive procedures, and subsequent aesthetic procedures.

### Query Execution

A sequence of queries was executed on PearlDiver, beginning with identifying the mastectomy cohort (CPT codes 19303, 19304, 19305, 19306, 19307). Those who underwent breast reconstruction were then identified and compiled using alloplastic (CPT codes 19366, 11970, 19340, 19342) and autologous (CPT codes 19361, 19364, 19367, 19368, 19369) reconstruction CPT codes. A separate cohort of patients who had subsequent aesthetic procedures was then identified using a set of CPT codes (15847, 15832, 15836, 30400, 30420, 15824, 15826, 15825, 15828, 15829, 30410). For the mastectomy with reconstruction group, intersections with the aesthetic procedure cohorts were examined to identify patients who had

## Takeaways

**Question:** What, if any, differences exist in the trends of aesthetic procedures sought by patients who have undergone mastectomy with and without breast reconstruction?

**Findings:** In our database, more patients who have undergone mastectomy with breast reconstruction sought subsequent aesthetic procedures than those who chose mastectomy alone.

**Meaning:** Patient satisfaction postmastectomy may be influenced by the pursuit of subsequent aesthetic procedures; patients may benefit from discussing such options throughout their breast reconstruction journeys.

additional cosmetic interventions after the index breast reconstruction procedure(s). To be included, patient records had to have claims data including: a mastectomy CPT code with or without one alloplastic or autologous breast reconstruction CPT code following the mastectomy CPT code log date, and at least one aesthetic procedure CPT code following the mastectomy or breast reconstruction CPT code log date. (See table, Supplemental Digital Content 1, which displays the CPT codes used for analysis. <http://links.lww.com/PRSGO/D328>.)

### Statistical Analysis

For each identified cohort, the total number of patients, dates of procedures, and units of services provided were collated. Statistical analyses, including descriptive, correlation, and Student *t* test, were conducted using PearlDiver's incorporated R statistical programming software. Descriptive statistics, including the two-proportion z-test, were used to describe patient demographics and procedural details. Cohort comparisons identified the rates of aesthetic procedures in patients with and without reconstruction. Regional and demographic breakdown allowed for data stratification by age, gender, geographic region, and year of service. Statistical significance was noted by a *P* value less than 0.05.

## RESULTS

### Patient Characteristics

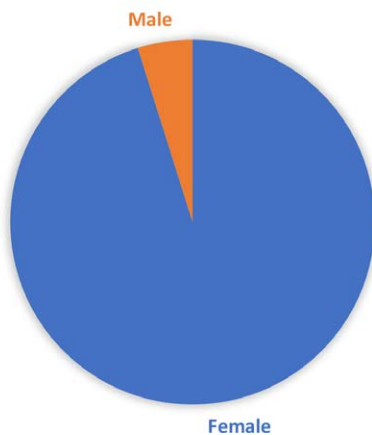
Our query resulted in 609 patients who underwent mastectomy with reconstruction and subsequent aesthetic procedures and 329 patients who underwent mastectomy without reconstruction and subsequent aesthetic procedures; these cases were analyzed for their association with specific aesthetic procedures. Demographic information is displayed in Table 1. In the reconstruction group, a significantly higher proportion of patients were in the 40–49 age range ( $n = 205$ ; 33.7%) compared with the nonreconstruction group ( $n = 77$ ; 23.4%;  $P < 0.001$ ). Conversely, the nonreconstruction group was older with more patients in the 70–79 age range ( $n = 34$ , 10.3%,  $P < 0.001$ ). The reconstruction group comprised exclusively female patients ( $n = 609$ , 100%), whereas the nonreconstruction group included a small percentage of male patients ( $n = 16$ , 4.9%,  $P < 0.001$ ; Fig. 1).

**Table 1. Demographic Comparison of Mastectomy Patients Undergoing Subsequent Aesthetic Procedures**

Demographic Category	Mastectomy with Reconstruction, n (%)	Mastectomy without Reconstruction, n (%)	P	Summary of Difference
Total cases	N = 609	N = 329		
Age range				
30–39	52 (8.54)	27 (8.21)	0.40	Similar distribution between groups
40–49	205 (33.66)	77 (23.40)	<b>&lt;0.001</b>	10% higher in reconstruction group
50–59	222 (36.45)	115 (34.95)	0.27	Similar distribution between groups
60–69	110 (18.07)	72 (21.88)	<b>0.04</b>	3.8% higher in nonreconstruction group
70–79	18 (2.96)	34 (10.33)	<b>&lt;0.001</b>	7.4% higher in nonreconstruction group
Service location				
Inpatient	45 (7.39)	37 (11.25)	<b>0.04</b>	3.9% higher in nonreconstruction group
Outpatient	562 (92.29)	294 (89.36)	<b>0.04</b>	3% higher in reconstruction group

Bolded P values indicate statistical significance ( $P < 0.05$ ).

### MASTECTOMY WITHOUT RECONSTRUCTION



**Fig. 1.** Sex breakdown of patients who underwent mastectomy without reconstruction: women (95.14%); men (4.86%);  $P < 0.001$ .

#### Rates of Aesthetic Procedures

Mastectomy with reconstruction was associated with a significantly higher rate of subsequent aesthetic procedures (0.7%, 609 out of 82,710) compared with those without reconstruction (0.1%, 329 out of 282,815,  $P < 0.001$ ; Table 2). Thousands of patients chose not to undergo subsequent aesthetic procedures; reasons for this are not able to be elucidated within the constraints of our database.

#### Aesthetic Procedures Postmastectomy

The analysis of specific aesthetic procedures showed patterns between the groups (Table 3 and Fig. 2). The mastectomy with reconstruction group had a significantly higher rate of abdominoplasty ( $n = 244$ , 40.1%;  $P < 0.001$ ) compared with the nonreconstruction group (abdominoplasty  $n = 63$ , 19.2%). Procedures such as rhytidectomy of the cheek, chin, and neck ( $n = 19$ , 3.1%;  $P = 0.01$ ) and

primary rhinoplasty of the lateral and alar cartilages and/or elevation of the nasal tip ( $n = 13$ , 2.1%;  $P = 0.04$ ) were performed exclusively in the reconstruction group.

### DISCUSSION

We analyzed the difference in the pursuit of additional aesthetic procedures between patients who have undergone mastectomy with breast reconstruction and those who chose not to have breast reconstruction. Specifically, the incidence of aesthetic procedures is higher in the reconstruction group (0.7%) compared with the nonreconstruction group (0.1%;  $P < 0.001$ ). These findings highlight that patients undergoing breast reconstruction after mastectomy may be more inclined to pursue additional aesthetic procedures, without implying causation.

A higher propensity for reconstruction and subsequent aesthetic interventions was observed among younger patients, particularly those aged 40–49. This trend could be reflective of a generation more in tune with aesthetic concerns and body image, social media, and celebrity influence.<sup>12</sup> This likely connection between perceived body image and pursuit of breast reconstruction as well as aesthetic procedures would be interesting to qualify in future work through focus groups and interviews. Furthermore, the exclusive representation of women in the reconstruction group contrasts the inclusion of a small male cohort in the nonreconstruction group. This gender difference raises important questions about the societal and psychological factors influencing men’s and women’s decisions regarding breast/chest reconstruction and aesthetic enhancements postmastectomy and in general. Men are beginning to seek more cosmetic procedures,<sup>13,14</sup> and understanding that patients of different ages, generations, and genders may have different expectations and aesthetic goals is important in aligning surgical strategies with patient desires.<sup>15</sup> There is ample literature around these elements of gender-affirming chest surgery and mastectomy as well

**Table 2. Rates of Aesthetic Procedures following Mastectomy**

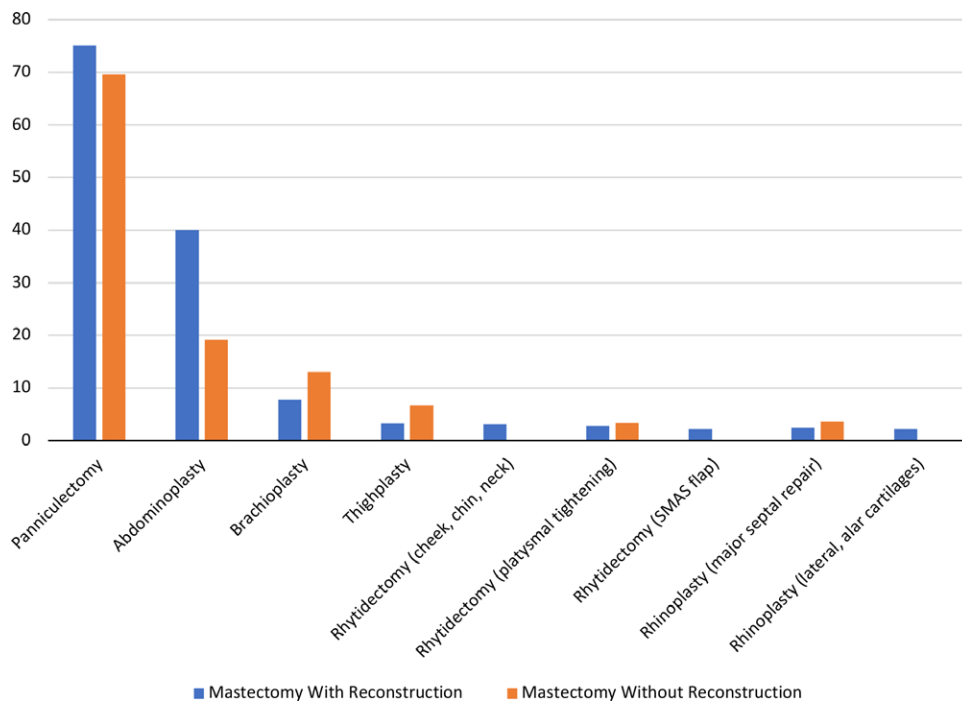
Type of Mastectomy	No. Patients	No. Aesthetic Procedures	Rate of Aesthetic Procedures (%)	P
Mastectomy without reconstruction	282,815	329	0.116	NA
Mastectomy with reconstruction	82,710	609	0.736	<b>&lt;0.001</b>

Note: Rates are calculated as the proportion of patients undergoing aesthetic procedures following mastectomy. Statistical tests compared rates for each reconstruction group versus the group without reconstruction. Bolded P values indicate statistical significance ( $P < 0.05$ ).

**Table 3. Aesthetic Procedures following Mastectomy**

Procedure	Mastectomy with Reconstruction, n (%)	Mastectomy without Reconstruction, n (%)	P	Summary of Difference
Excision, abdominal panniculectomy (CPT-15830)	458 (75.04)	229 (69.60)	0.12	No significant difference in rates between groups
Abdominoplasty (CPT-15847)	244 (40.07)	63 (19.15)	<b>&lt;0.001</b>	Rate higher in mastectomy with reconstruction group
Excision, arm lipectomy (brachioplasty) (CPT-15836)	47 (7.71)	43 (13.07)	<b>0.02</b>	Rate higher in mastectomy without reconstruction group
Excision, thigh lipectomy (CPT-15832)	20 (3.28)	22 (6.69)	0.08	No significant difference in rates between groups
Rhytidectomy; cheek, chin, neck (CPT-15828)	19 (3.12)	0 (0.00)	<b>0.01</b>	Procedure only done in mastectomy with reconstruction group
Rhytidectomy; neck platysmal tightening (CPT-15825)	17 (2.79)	11 (3.34)	0.32	No significant difference in rates between groups
Rhytidectomy; SMAS flap (CPT-15829)	13 (2.13)	0 (0.00)	<b>0.03</b>	Procedure only done in mastectomy with reconstruction group
Rhinoplasty with major septal repair (CPT-30420)	15 (2.46)	12 (3.65)	0.15	No significant difference in rates between groups
Rhinoplasty; lateral and alar cartilages (CPT-30400)	13 (2.13)	0 (0.00)	<b>0.04</b>	Procedure only done in mastectomy with reconstruction group

SMAS, superficial musculoaponeurotic system. Bolded P values indicate statistical significance ( $P < 0.05$ ).



**Fig. 2.** Percentages of aesthetic procedures following mastectomy, with (blue) and without (orange) reconstruction.

as mastectomy for breast cancer in non-cis individuals,<sup>16,17</sup> but a lack of published work describing chest reconstruction after mastectomy in cis-men.

The emphasis on abdominoplasty, particularly in the reconstruction group, aligns with trends noted in the literature describing how postreconstruction patients often seek procedures that enhance overall body contour and symmetry.<sup>12</sup> Many of the patients who underwent breast reconstruction likely had abdominally-based flaps, thus precluding them from future abdominoplasty; therefore,

the difference in abdominoplasty between groups is expected. The codes that identified patients who underwent deep inferior epigastric artery perforator flaps, for example, did not include abdominoplasty; thus, such abdominally-based reconstructions were separated from any subsequent abdominal body contouring procedures. Interestingly, brachioplasty was more prevalent in the non-reconstruction group, likely influenced by factors such as age, weight changes postmastectomy, and individual aesthetic desires.<sup>18,19</sup>

Understanding patient preferences can guide clinicians in addressing the aesthetic needs of patients who have undergone mastectomy, potentially influencing patient satisfaction and quality of life postsurgery. Our findings highlight the potential role of comprehensive preoperative counseling incorporating the option of subsequent aesthetic procedures into the initial visits focused on reconstructive options. Patient-centered care is paramount in breast reconstruction, and surgeons should elicit patient goals and preferences and make recommendations in a shared decision-making approach in the context of their unique psychosocial situations.<sup>20,21</sup>

Our study has several limitations, largely due to the nature of the PearlDiver database. PearlDiver, as an insurance claim database, providing data on the number of cases found with selected procedural codes and only general ancillary data such as age, gender, date, drug group, length of stay, and insurance plan type. Identification and analysis of medical history; other demographic factors; and clinical variables (such as different surveillance protocols, differences between prophylactic mastectomy and mastectomy for cancer, and timing of reconstruction—immediate versus delayed) was therefore unable to be completed. Because this retrospective analysis relies on coded procedural data, it also does not capture qualitative data like patient motivations and satisfaction. Additionally, the use of specific CPT codes for patient identification could introduce selection bias, possibly not capturing the diverse experiences of the broader mastectomy population, thus limiting the generalizability of our results. Finally, this study inherently uses billing codes as a representation of procedures performed, which may not accurately reflect actual specific procedures but serves as a surrogate for those procedures. To mitigate this ambiguity, future work should include analysis of operative reports to glean more granular detail for specific procedures.

Our study initiates the conversation on exploring rates of subsequent aesthetic procedures among those who undergo mastectomy followed by breast reconstruction as well as mastectomy alone. Future research should incorporate methodology that overcomes the limitations of our database, including discerning whether reconstructions were immediate or delayed and associated trends with subsequent aesthetic procedures, any correlations between reason for mastectomy and specific aesthetic procedures sought, as well as those between method of reconstruction (specific procedure performed) with associated aesthetic procedures. An important next step would focus on exploration of outcomes that matter most to patients. This shift may be achieved by integrating additional data on patient-centered and patient-reported outcomes, such as satisfaction and psychosocial well-being. Qualitative analysis through focus groups or interviews may be an additive approach to aid in understanding the motivations and decision-making factors that lead patients to opt for subsequent aesthetic procedures. Ultimately, a comprehensive approach that combines quantitative and qualitative methods will enrich our understanding of the trends in subsequent aesthetic procedures postmastectomy. This multidimensional perspective is essential for refining surgical decision-making processes and discussions, ensuring

they are aligned with both the clinical needs of patients and their goals and preferences.

## CONCLUSIONS

Our findings describe trends of aesthetic procedures following mastectomy, which may influence the surgeon's approach to patient counseling and surgical planning. Understanding the propensity for additional aesthetic procedures can aid in setting realistic expectations and improving patient satisfaction with postoperative outcomes. This study emphasizes the importance of considering a holistic approach to breast reconstruction that focuses on not only physical restoration but also aesthetics.

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## DISCLOSURE

*The authors have no financial interest to declare in relation to the content of this article.*

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