

Original Article



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Comparison of Outcomes After Autologous Breast Reconstruction: Pedicled Extended Latissimus Dorsi Flap Versus Pedicled Transverse Rectus Abdominis Myocutaneous Flap

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Article Info

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Date Received:

08th Mar, 2026

Date Revised:

27th May, 2026

Date Accepted:

03rd June, 2026



This article may be cited as:

Shoaib M, Rashid M, Rehman SU, Mohmand S, Abbas R, Azad H. Comparison of quality of recovery and complications after pedicled extended latissimus dorsi versus pedicled tram flap breast reconstruction. J Postgrad Med Inst. 2026;40(2):122-128. <http://doi.org/10.54079/jpmi.40.2.3933>

Abstract

Objective: To compare the quality of life following autologous breast reconstruction using pedicled Extended Latissimus dorsi (pELD) flap versus pedicled Transverse Rectus Abdominis Myocutaneous (pTRAM) flap, including post-operative complications.

Methodology: This prospective comparative observational study was conducted at the Department of Plastic Surgery, Shifa International Hospital, Islamabad, between 18th November 2025 and 18th February 2026. A total of 40 women aged 30–70 years undergoing immediate autologous breast reconstruction were included using non-probability consecutive sampling. Of these, 18 underwent pELD reconstruction and 22 underwent pTRAM reconstruction. All patients completed the 3-month follow-up and were included in the final analysis. Data on demographic characteristics, operative parameters, and postoperative outcomes were collected. Quality of recovery was assessed using the validated Quality of Recovery-15 (QoR-15) questionnaire at baseline, Week 1, Week 4, and Week 12. Statistical analysis was performed using SPSS version 26.0 with $p < 0.05$ considered significant.

Results: No statistically significant differences were observed between the groups regarding operative time, hospital stay, mobilization, or QoR-15 scores at any assessment point. Seroma formation was significantly higher in the pELD group compared with the pTRAM group [7/18 (38.9%) vs 1/22 (4.5%), $p = 0.018$]. Both groups demonstrated an early postoperative decline in QoR-15 scores followed by gradual improvement by week 12. QoR-15 scores did not differ significantly between the two groups at baseline, week 1, week 4, or week 12.

Conclusion: Both pELD and pTRAM flaps demonstrated comparable safety profiles and postoperative quality-of-recovery outcomes. The main distinction was a higher occurrence of seroma in those who underwent pELD reconstruction. However, overall recovery patterns were similar between techniques.

Keywords: Autologous breast reconstruction, Extended Latissimus Dorsi flap, Pedicled TRAM flap, Seroma formation, Quality of recovery, QoR-15

Introduction

One of the most widespread malignancies in women all over the world is breast cancer. The American Cancer Society suggests that in their lifetime, one out of every eight women will have breast cancer.¹ A large percentage of them are subject to mastectomy as a component of their oncologic treatment. Though mastectomy is an important treatment option for breast cancer, it can have a detrimental impact on the body image, femininity, psychological well-being, and the overall quality of life (QoL).² Immediate breast reconstruction plays a vital role in improving the QoL, psychosocial wellbeing, sexual wellbeing, and overall confidence of these women.³

Autologous breast reconstruction involves the use of the own tissue of the patient and can be broadly classified into pedicled and free tissue transfer methods. The pELD flap and pTRAM flap are among the most commonly used pedicled reconstruction options. Each technique has distinct advantages, limitations, and indications.⁴

The pELD flap technique involves harvesting a combination of skin, fat, and muscle from the dorsal (back) region. It is known for its reliable vascularity and versatility in shaping.^{5,6} Conversely, the pTRAM flap involves transposition of abdominal skin, fat, and a portion of the rectus abdominis muscle to the chest. This technique is suitable for reconstruction of moderate-to-large breast volumes without implants. It may also provide improved abdominal contour as an additional benefit.⁷

Although rates of complications are often examined, patient-centered outcomes (including quality of recovery/life) are also crucial in terms of measuring the reconstructive success. Recent surgical assessment has increasingly focused on functional recovery, emotional adjustment, and patient satisfaction. These factors are now considered alongside conventional surgical outcomes. Quality of Recovery-15 questionnaire (QoR-15) is a client-reported outcome measurement, which has been demonstrated to measure five areas of postoperative recovery including physical comfort, pain, physical independence, psychological support, and emotional state. The score ranges from 0 to 150 with greater scores indicating maximum recovery. Although international studies have compared surgical complications of pELD and pTRAM flaps, limited local data are available regarding structured patient-reported quality of recovery following these procedures in Pakistani patients.⁸

In the situation of Pakistan when resources are limited, and patient factors, comorbidities, and healthcare delivery models may not be similar to Western populations, evidence produced locally is crucial to inform surgical judgments. A comparison of structured quality-of-recovery assessment and postoperative complications, including flap necrosis, infection, and seroma

formation, may provide a more comprehensive evaluation of these reconstructive modalities. This type of data can assist in individual surgical planning in terms of patient comorbidity, donor-site suitability and patient expectation.

The aim of the study was to compare the quality of life following autologous breast reconstruction using pELD versus pTRAM flap, including post-operative complications.

Methodology

Study Design, Study Location, and study duration.

The research was a prospective comparative observational study that was carried out in the Department of Plastic Surgery, Shifa International Hospital, Islamabad. The research was conducted during three months, i.e. between 18th November 2025 and 18th February 2026. The data collection commenced with an Ethical approval of the Institutional Review Board of Shifa International Hospital, Islamabad. All the participants were recruited using the written informed consent.

Population and Sampling of the study.

The population of the study was made up of female patients who had been diagnosed with breast cancer and undergone immediate autologous breast operations using either pELD flap or a pTRAM flap.

The participants were between the ages of 30-70 years and Informed consent was taken. Patient preferences and characteristics were taken into consideration when choosing a flap. Patients who wanted to prevent an abdominal scar, had small-to-moderate breast volume, and had sufficient dorsal fat were more likely to have the pELD flap. It was also preferred in situations where it was thought to be unwise to use implants, like in patients who were expected to undergo postoperative radiation therapy, or when the added expense of an implant was a concern. On the other hand, patients with greater breast volume requirements, a significant excess of lower abdominal tissue (such as a lax abdomen or diastasis), or the existence of prior lower abdominal scars were evaluated the pTRAM flap.

Patients with active local or systemic infection during surgery, existing history of prior flap surgery and recurrent breast cancer were not included.

A total sample size of 40 patients were included in the study. Among the study population, 18 patients (45.0%) underwent pELD flap reconstruction, while 22 patients (55.0%) underwent pTRAM flap reconstruction. The distribution reflected the clinical eligibility and patient preferences during the study period. The sample size was determined based on feasibility within the study duration and comparable published studies evaluating patient-reported outcomes and postoperative complications in immediate autologous breast recon-

struction. The method used was non-probability consecutive sampling, and all the eligible patients willing to turn up throughout the study period were enrolled.

Data Collection Procedure

A structured proforma based on the objectives of the study was used to collect data. Preoperative measurements such as age, height, weight, body mass index (BMI), smoking status, and comorbidities (diabetes mellitus and hypertension) were measured. Every patient received thorough counseling about the advantages, restrictions, and possible drawbacks of every reconstructive procedure. After a thorough discussion, the patient's informed preference led to the final flap selection.

Perioperative data consisted of the type of flap required (pELD or pTRAM), the duration of operation, drain insertion and the complications during the operation. Medical records checked routine preoperative investigations such as complete blood count, clotting profile, renal functional tests and ABO grouping.

In the postoperative period, the follow-up assessments were made on postoperative day 1, week 1, weeks 2–4 and at 3 months. The quality of recovery/life outcomes were measured with the Quality of recovery-15 (QoR-15) validated questionnaire. The questionnaire would be conducted preoperatively (baseline), week 1, week 4 and 12 weeks long after the operation. The QoR-15 considers 5 domains, namely, physical comfort, pain, physical independence, psychological support, and emotional state. All items received a score out of 0 to 10 and the total score out of 0 to 150 was obtained and the higher the score the better the quality of recovery.

Post-operative complication like seroma formation at the donor site was the main variable of outcome. Seroma was characterized as clinically visible fluid accumulation (swelling, tenderness, fluctuation) and / or ultrasound-proven collection and needs aspiration or drainage. In the presence of the aspirated fluid, the dotted volume was recorded (in milliliters) approximately.

The secondary outcomes were infection of the wound, flap necrosis/failure, hematoma, pulmonary complications, length of stay in the hospital (in days), days to full mobilization, and days to normal activities. Functional outcomes including donor-site range of motion were also noted as well as subjective strength recovery (VAS-based strength score 0-10).

Data Analysis

Statistical Package for Social Sciences (SPSS) version 26.0 was used in entering and analyzing data. Age, BMI, operative time, hospital stay, seroma volume, and QoR-15 scores were represented through quantitative variables, which were presented in the form of mean and standard deviation. Presence of seroma, wound infection, flap necrosis and comorbidities are categori-

cal variables, which were expressed in frequencies and percentages.

Independent sample t-tests were used for normally distributed quantitative variables, while the Mann-Whitney U test was applied for non-normally distributed data. Categorical variables were compared using Chi-square test or Fisher's exact test where appropriate. The subgroup analysis was conducted when stratification was done on the basis of age groups (<40, 40-60, >60 years) to test the possibility of changing the effect. P-value of 0.05 was taken to be statistically significant.

Results

During the study period (18th November 2025 to 18th February 2026), 40 patients were enrolled and all completed the 3-month follow-up. Therefore, all patients were included in the final analysis.

Among the study population, 18 patients (45%) underwent pELD flap reconstruction, while 22 patients (55%) underwent pTRAM flap reconstruction.

Baseline demographic and clinical characteristics of the two groups were comparable, with no statistically significant differences observed between the groups as shown in Table 1 below.

No statistically significant differences were observed in age, BMI, diabetes status, smoking history, or prior abdominal surgery.

There were no statistically significant differences between groups regarding operative time and drain placement. Although pTRAM procedures demonstrated slightly longer operative duration, the difference was not statistically significant as shown in Table 2 below.

Seroma formation occurred in 8 patients (20.0%) overall and was significantly higher in the pELD group compared to the pTRAM group [7/18 (38.9%) vs 1/22 (4.5%), $p = 0.018$].

No statistically significant differences were observed between groups regarding wound infection, flap necrosis, hematoma, pulmonary complications, hospital stay, time to full mobilization, or return to normal activities as shown in Table 3 below.

Both groups demonstrated an expected decline in QoR-15 scores during the early postoperative period (week 1-week 4), followed by gradual improvement by Week 12. Although patients in the pTRAM group showed slightly higher QoR-15 scores during postoperative follow-up, the differences between the groups were not statistically significant at any time point ($p > 0.05$), as shown in Table 4.

These findings suggest similar trajectories of postoperative recovery between the two reconstructive techniques.

Table 1. Baseline Demographic and Clinical Characteristics (n = 40)

Variable	pELD (n=18)	pTRAM (n=22)	p-value
Age (years), Mean $\pm$ SD	45.6 $\pm$ 8.4	45.1 $\pm$ 8.3	0.842
BMI (kg/m ²), Mean $\pm$ SD	26.0 $\pm$ 3.1	26.4 $\pm$ 3.5	0.721
Hypertension, n (%)	7 (38.9%)	7 (31.8%)	0.646
Diabetes Mellitus, n (%)	5 (27.8%)	6 (27.3%)	0.972
Smoking, n (%)	3 (16.7%)	5 (22.7%)	0.633
Previous Abdominal Surgery, n (%)	3 (16.7%)	5 (22.7%)	0.633

Table 2. Intraoperative Surgical Parameters (n = 40)

Variable	pELD (n=18)	pTRAM (n=22)	p-value
Operative Time (minutes), Mean $\pm$ SD	206 $\pm$ 29	225 $\pm$ 35	0.094
Drain Placement, n (%)	18 (100.0%)	21 (95.5%)	0.364

Table 3. Postoperative Complications and Recovery Outcomes (n = 40)

Variable	pELD (n=18)	pTRAM (n=22)	p-value
Seroma Formation, n (%)	7 (38.9%)	1 (4.5%)	0.018
Wound Infection, n (%)	1 (5.6%)	1 (4.5%)	1.000
Marginal Flap Necrosis, n (%)	0 (0.0%)	1 (4.5%)	0.311
Hematoma, n (%)	1 (5.6%)	1 (4.5%)	1.000
Pulmonary Complications (Atelectasis), n (%)	0 (0.0%)	1 (4.5%)	0.311
Hospital Stay (days), Mean $\pm$ SD	2.5 $\pm$ 2.0	2.6 $\pm$ 2.1	0.874
Time to Full Mobilization (days), Mean $\pm$ SD	9.4 $\pm$ 3.2	10.5 $\pm$ 3.7	0.294
Return to Normal Activities (days), Mean $\pm$ SD	35.6 $\pm$ 7.9	37.8 $\pm$ 8.4	0.391

Table 4. Quality of Recovery (QoR-15) Scores at Different Time Points (n = 40)

Time Point	ELD (Mean $\pm$ SD)	pTRAM (Mean $\pm$ SD)	p-value
Baseline (Preoperative)	142.6 $\pm$ 5.3	143.1 $\pm$ 5.2	0.783
Week 1	118.7 $\pm$ 8.6	122.8 $\pm$ 8.2	0.169
Week 4	113.1 $\pm$ 9.7	117.5 $\pm$ 9.0	0.184
Week 12	137.2 $\pm$ 6.5	139.8 $\pm$ 5.9	0.204

Discussion

The study made comparisons of quality-of-recovery outcomes and postoperative complications in pELD flap and pTRAM flap in immediate autologous breast reconstruction. The total number of patients who completed the 3-month follow-up was 40. The demographic features at the baseline were similar in the two, indicating that there were no discrepancies in key factors. This suggests that the groups were reasonably comparable and allowed assessment of postoperative recovery and complication profiles between the two

reconstructive techniques.

The assessment of postoperative recovery using the validated QoR-15 questionnaire was a major strength of this study. Both groups demonstrated an expected decline in QoR-15 scores during the early postoperative period, followed by gradual improvement by Week 12. Importantly, no statistically significant differences were observed between the pELD and pTRAM groups at any assessment point. Although the pELD group experienced a higher rate of seroma formation, this did not translate into significantly worse patient-reported recovery outcomes at 12 weeks. These findings sug-

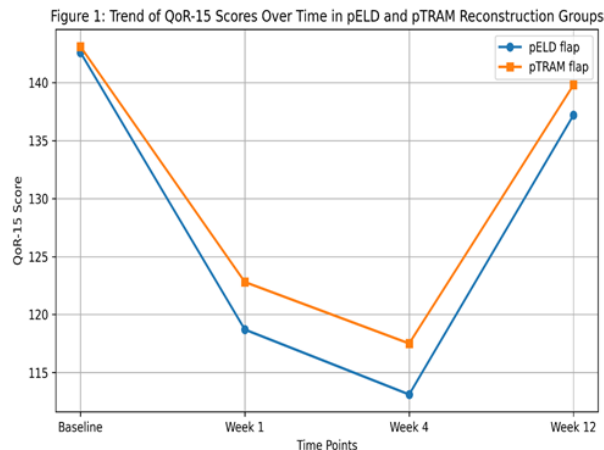


Figure 1: Trend of Quality of Recovery (QoR-15) Scores Over Time

gest that both reconstructive techniques provide comparable functional and emotional recovery during the early postoperative period.⁹

Despite similar QoR-15 recovery profiles, postoperative complication patterns differed between the two groups, particularly regarding seroma formation. Seroma formation was observed more frequently in patients undergoing pELD flap reconstruction (38%) compared with the pTRAM group (4.5%). This is consistent with earlier research that found seroma to be the most frequent donor-site consequence after latissimus dorsi harvest, with rates ranging from 20 to 50%. This is probably because the procedure creates a huge dead area and causes considerable tissue dissection in the back make it more likely that lymphatic disruption and postoperative fluid collection will occur.^{10,11}

Operative duration, hospital stay, mobilization, and return to normal activities were comparable between the two groups. In contrast, the lower seroma rate found in the pTRAM group is consistent with prior research demonstrating less donor-site morbidity when abdominal tissue is used, while abdominal wound complications remain a concern.¹² However, our cohort did not show any appreciable increase in flap necrosis or abdominal wound morbidity, which is consistent with previous retrospective studies contrasting pedicled abdominal flaps with alternative autologous restoration techniques.¹³ Therefore, flap selection should be individualized, taking into account patient anatomy, comorbidities, size of breasts, prior abdominal surgery, lifestyle factors, and patient preference. The comparable QOR-15 results reinforce that both approaches are viable options in appropriately selected patients.

There was a slight difference in the time taken in the pTRAM group, but the difference was not significant. Comparative studies carried out previously have documented a large and prolonged duration of operations in abdominal flap reconstruction because there was an

extended dissection and a closure of the abdominal wall.¹⁴ However, according to other modern studies, their differences in the length of operations between the pedicled methods could decrease as the level of the surgical skills and the standardization of the procedures rises.^{15,16} This change of views is echoed by our results, which show that both methods are equally efficient as far as related to surgery in skilled hands.

The fact that flap necrosis and hematoma were very low in our study is another evidence of the technical reliability of the method of pedicled autologous reconstruction when carried out in reference to proper patient selection criteria.

Parameters such as hospital stay time and time to full mobilization as well as time to normal activities were almost in both groups. Mean hospital stay in our group was 2.5 SD 2.0 days and fits the increased recovery pathways outlined in modern reconstructive literature.^{17,18} These protocols of structured perioperative care, and early mobilization have demonstrated to lower the length of stay in hospitals without escalating the number of complications.^{18,19} We report positive results of early discharge in a patient who has undergone pELD and pTRAM reconstruction as long as their postoperative recovery is not complicated.

Taken together, these findings suggest that although pELD flap reconstruction is associated with a higher risk of seroma formation, this complication does not appear to adversely affect medium-term patient-reported recovery outcomes. Similarly, pTRAM reconstruction did not demonstrate inferior functional or emotional recovery despite abdominal wall manipulation. Therefore, flap selection should be individualized according to patient anatomy, comorbidities, donor-site suitability, breast size, surgeon expertise, and patient preference rather than concerns regarding postoperative quality of recovery alone.

Limitations:

This study has several limitations. Flap selection was based on patient preference, anatomical suitability, and surgeon judgment rather than randomization, which may have introduced selection bias. In addition, the feasibility-based sample size and relatively short follow-up duration may limit statistical power and generalizability of the findings. Repeated QoR-15 measurements were analyzed using independent comparisons at each time point rather than repeated measures modeling, which may not fully account for within-subject longitudinal changes. Future multicenter studies with larger sample sizes, longer follow-up periods, and more robust longitudinal statistical analyses are recommended to validate these findings.

Conclusion

Both pedicled Extended Latissimus Dorsi and pedicled Transverse Rectus Abdominis Myocutaneous flaps showed safe and effective results when it comes to autologous breast reconstruction, both had similar operative parameters, quality-of-recovery curves and complication profiles (except seroma). Although seroma formation was more common in the ELD group and did not require major intervention, it did not negatively affect patient-reported quality-of-life outcomes at three months. Overall, both techniques provided similar improvements in physical, functional, and emotional recovery, suggesting that flap selection should be individualized based on patient characteristics, breast size, donor-site suitability, comorbidities, and surgical expertise rather than concerns regarding postoperative quality of life alone.

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Authors' Contribution Statement

MS contributed to the conception, design, acquisition, analysis, interpretation of data, drafting of the manuscript, and critical review of the manuscript. MR contributed to the conception, design, acquisition, analysis, drafting of the manuscript, critical review of the manuscript, and final approval of the version to be published. SUR contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. SM contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. RA contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. HA contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Conflict of Interest

Authors declared no conflict of interest

Grant Support and Financial Disclosure

None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.