Egypt, J. Plast. Reconstr. Surg., Vol. 49, No. 4, October: 305-312, 2025

Extended Brachioplasty Incision Through Posterior Axilla, Does it Have an Impact on Final Results? Our Experience

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Abstract

Background: Brachioplasty procedures have increased dramatically in popularity, yet postoperative scarring remains patients' primary concern.

Objectives: This study evaluates the impact of extending brachioplasty incisions through the posterior axillary fold on scar quality and functional outcomes.

Patients and Methods: This retrospective single-arm interventional study examined 40 female patients (aged 30-60 years) who underwent brachioplasty. All procedures utilized a standardized technique with incisions beginning above the elbow, extending to the axillary fold, and continuing through the posterior axilla. Patient satisfaction was assessed using a 5-point Likert scale. Complications and recurrence were documented at week 1, month 1, month 3, and month 6 post-operatively.

Results: Mean patient age was 44.6±8.47 years with mean BMI 35.8±7.79kg/m^2. The success rate was 92.5%, with 75% of patients reporting satisfaction or high satisfaction. Complications included hypertrophic scarring (27.5%), temporary numbness (15%), mild wound dehiscence (7.5%), and seroma (2.5%). Recurrence rate was 7.5%.

Conclusions: Extended brachioplasty approach through the posterior axilla demonstrates promising results with a high success rate and satisfactory outcomes for most patients. While complications remain with limited incidence, particularly hypertrophic scarring, this technique provides effective aesthetic results with acceptable morbidity.

Key Words: *Brachioplasty – Posterior axillary extension – Complications, Scar quality – Patient satisfaction.*

Ethical Committee: Approved by the ethical committee of the Faculty of Medicine, Tanta University; Approval code: 36264PR34/1/23.

Disclosure: No disclosure.

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Introduction

The aesthetic upper arm is characterized by a lean, tapering contour with anterior convexity from deltoid to biceps regions **[1]**. Brachial deformities, including skin laxity with or without fat excess, often extend from olecranon to chest wall, resulting in increased inferior arm curvature. These deformities are particularly pronounced in aging skin or following substantial weight loss **[2]**.

Various arm rejuvenation techniques have emerged, including longitudinal dermolipectomy with scars positioned along the brachial sulcus, deepithelialized rolled flaps, fascial system suspensions, and lipoaspiration. However, these approaches have not delivered complete satisfaction to patients or surgeons **[3,4]**.

The demand for brachioplasty is widely on the rise **[5]**. Brachioplasty procedures have gained remarkable popularity, with documented increases of 4,191% over eight years in the United States compared to just 36% for breast augmentation during the same period **[6]**. Despite numerous technical refinements, postoperative scarring remains the foremost concern for patients undergoing this procedure **[7,8]**.

The primary objective of brachioplasty is restoring arm contour through excision of redundant skin and fat, thereby enhancing both function and appearance **[9]**. Traditional approaches involve incisions along the inner arm from elbow to axilla, but variations in incision placement continue to evolve as surgeons pursue less visible scarring solutions **[10]**.

One notable variation extends the brachioplasty incision through the posterior axillary fold, potentially offering improved tissue access, enhanced upper arm contouring and removes the most excess tissue and fat and decrease the presence of dog ears, bulkness or crumpling. It addresses laxity on the

arms and sides of the chest. This could be a great option for patients with extreme saggy arm skin after major weight loss [11]. This approach leverages the natural fold of the posterior axilla to minimize visible scarring [12]. However, this technique raises questions regarding functional outcomes, recovery time, and overall aesthetic results [13].

While numerous studies have investigated brachioplasty techniques, focusing on incision types, scar placement, and complications, the specific effects of incorporating a posterior axillary extension remain inadequately defined [14,15].

This study aims to evaluate the impact of extended posterior axillary incision on scar quality and range of movement following brachioplasty.

Patients and Methods

This retrospective single-arm interventional study was conducted on 40 females aged between 30 and 60 years, had maintained stable body weight since the time of their surgical intervention who underwent brachioplasty procedures at Plasticl Surgery Department, Tanta University Hospitals, Egypt between January 2020 and December 2024. The analysis was performed retrospectively during the period from January 2025 to February 2025, following approval from the institutional ethical committee. Informed written consent was obtained from each woman. All patients are considered as grade 4 arm deformity with skin laxity extended along lateral chest wall. In post bariatric patient doing breasst lifting in the same surgery the posterior axillary scar was considered to join the scar for breast lifting.

Exclusion criteria were patients with consumptive diseases like cancer, HIV/AIDS, or organ failure, as these could compromise tissue healing and surgical outcomes. Individuals with significant weight gain from failed bariatric interventions and those with cognitive impairments (e.g., dementia, Alzheimer's) were also excluded. Additional criteria included psychological disorders (body dysmorphic disorder, eating disorders), uncontrolled chronic medical comorbidities, and respiratory conditions like Chronic Obstructive Pulmonary Disease (COPD) due to their potential impact on perioperative risks, patient perception, and the objective assessment of surgical outcomes.

A comprehensive preoperative assessment was conducted for all patients. This included detailed medical and surgical history documentation, followed by thorough clinical examination. Standard laboratory investigations were performed, comprising complete blood count, coagulation studies, and assessments of renal and hepatic function to ensure patients were medically fit for the surgical procedure.

All surgical interventions were conducted under standardized conditions to minimize procedural variability. The operations were performed in the same surgical setting, by a single experienced surgeon, utilizing identical surgical tools and techniques across all cases. This methodological consistency was implemented to reduce potential confounding factors related to surgical technique or operator experience.

Surgical technique:

The brachioplasty procedure was executed with meticulous attention to anatomical considerations and aesthetic outcomes. Preoperative marking was performed with the patient in a standing position, with the arm abducted at 90 degrees and the elbow flexed at 80 degrees. This positioning facilitated accurate demarcation of the surgical site. The incision line was drawn parallel to and 1-2cm above the brachial groove, with the extent of tissue resection estimated and the posterior line clearly outlined. The extensionn of the incision in the axilla is marked after putting the arm in extended position as shown in pre-operative marking in Fig. (1).

The surgical incision commenced above the elbow, proximal to the medial epicondyle of the humerus, and extended to the edge of the axillary fold. A second transverse zone continued from this initial incision, beginning at the anterior axillary fold and terminating at the posterior axillary fold along the anterior margin of the hairy area. This created a fish-shaped incision pattern, with the body positioned in the arm and the tail angled within the axilla.

For cases presenting with excess skin extending to the lateral chest wall, the excision was appropriately extended in that direction. Particular care was taken within the axillary region to preserve the fascia superficialis. Additionally, a Z-plasty technique was employed to break the linear nature of the incision, with the dual purpose of minimizing tissue retraction and adhesion formation, while also reconstructing the natural morphology of the axilla.

Wound closure is done in 3 layers, the superficial fascia of the arm was elevated and secured to the corresponding fascia of the axilla using interrupted 2/0 pds sutures. This technique was implemented to prevent post-operative sagging and to achieve harmonious arm contour. Wound clo-

sure proceeded with subdermal approximation using continuous 2/0 pdssutures, followed by 3/0 monocryle intradermal sutures. The closed incision was dressed with gauze impregnated with antibacterial ointment and externally reinforced with intersecting strips of micropore tape. All procedures were conducted under general anesthesia, and single-dose antibiotic prophylaxis was administered uniformly to all patients.

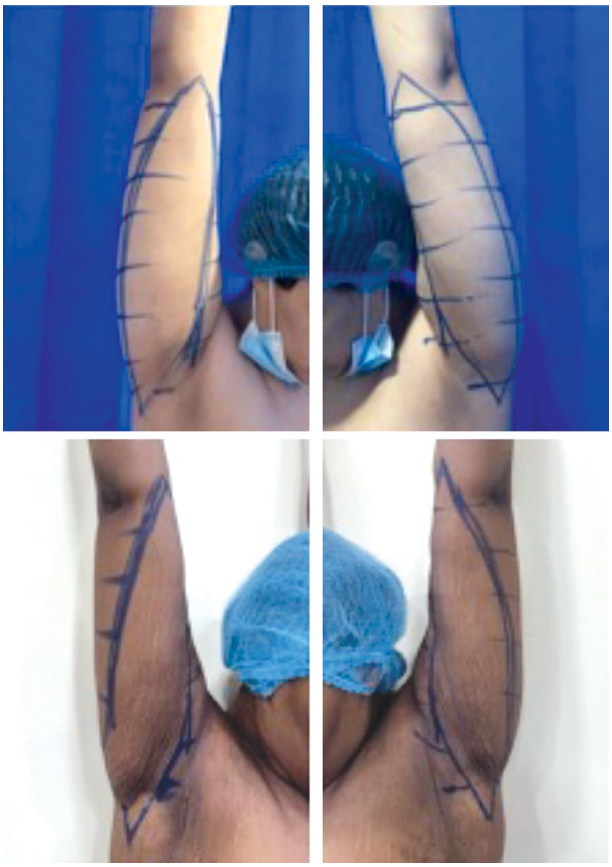

Fig. (1): Showing extension of skin incision in the axilla after pre-operative marking Post-operative management and follow-up.

Postoperative management and follow-up:

Initial wound assessment was performed on the first postoperative day, and all patients were discharged within 24 hours following surgery. A structured follow-up schedule was implemented, with clinical evaluations conducted at 1 week, 1, 3, 6, and 12 months postoperatively Fig. (2). During each follow-up visit, particular attention was directed toward detecting any wound complications including asymmetry, wound dehiscence, hypertrophic scarring, temporary numbness of the skin on the medial aspect of the arm, seroma formation recurrence of tissue laxity.

Patient satisfaction, which was systematically evaluated using a validated 5-point Likert scale **[16]**. This assessment tool ranged from 1 (very dissatisfied) to 5 (very satisfied), with intermediate values of 2 (dissatisfied), 3 (moderately satisfied), and 4 (satisfied). Multiple dimensions of satisfaction were analyzed, including the location, symmetry, and quality of the scar, overall arm contouring, and general aesthetic outcome. This multidimensional approach provided a comprehensive evaluation of patient perception regarding the surgical results.

Outcome assessment:

The outcome measure focused on patient satisfaction and comprehensive documentation of complications.

Sample size calculation:

The sample size was calculated using the Epi-Info 2002 statistical software package, developed by the World Health Organization and the Centers for Disease Control and Prevention. The calculation was based on a 95% confidence level and an estimated 90% incidence of overall patient satisfaction, as reported in a previous study **[17]**, with a ±10% confidence limit. To account for potential dropout, an additional five cases were included. Consequently, a total of 40 cases were recruited for the study.

Statistical analysis:

Statistical analysis was done by SPSS v26 (IBMInc., Chicago, IL, USA). Quantitative variables were presented as mean and standard deviation (SD). Qualitative variables were presented as frequency and percentage.

Results

The mean age was 44.6±8.47 years, weight 97.6±18.02kg, height 1.66±0.06m, and body mass index 35.8 (±7.79) kg/m^2. Diabetes mellitus was present in 6 (15%) patients, hypertension was present in 9 (22.5%) patients and Chronic kidney disease was present in 2 (5%) patients. Table (1).

The incidence of success rate was 37 (92.5%). Regarding patients' satisfaction, 22 (55%) patients were very satisfied, 8 (20%) patients were satisfied, 7 (17.5%) patients were moderately satisfied, 1 (2.5%) patient was dissatisfied and 2 (5%) patients were very dissatisfied. Table (2).

The incidence of seroma was 1 (2.5%) patient. The incidence of mild wound dehiscence 3 (7.5%) patients. The incidence of hypertrophic scar was 11 (27.5%) patients. The incidence of temporary numbness of skin of medial aspect of the arm was 6 (15.0%) patients. Recurrence rate was 3 (7.5%) of patients. Table (3).

Table (1): Demographic data and medical history of the studied patients.

	(n=40)
Age (years)	44.6±8.47
Weight (kg)	97.6±18.02
Height (m)	1.66±0.06
BMI (Kg/m^2)	35.8±7.79
Medical history:	
DM	6 (15%)
HTN	9 (22.5%)
CKD	2 (5%)

Data are presented as mean ± SD or frequency (%).
BMI : Body mass index. HTN: Hypertension.
DM : Diabetes mellitus. CKD: Chronic kidney disease.

Table (2): Success rate and patients' satisfaction of the studied patients.

	(n=40)
Success rate	37 (92.5%)
Patients' satisfaction:	
Very satisfied	22 (55%)
Satisfied	8 (20%)
Moderately satisfied	7 (17.5%)
Dissatisfied	1 (2.5%)
Very dissatisfied	2 (5%)

Data are presented as frequency (%).

Table (3): Adverse events and recurrence rate of the studied patients.

	Postoperative
Seroma	1 (2.5%)
Mild wound dehiscence	3 (7.5%)
Hypertrophic scar	11 (27.5%)
Temporary numbness of skin of medial aspect of the arm	6 (15.0%)
Recurrence rate	3 (7.5%)

Data are presented as frequency (%).

Case (1) was explained in Fig. (2).

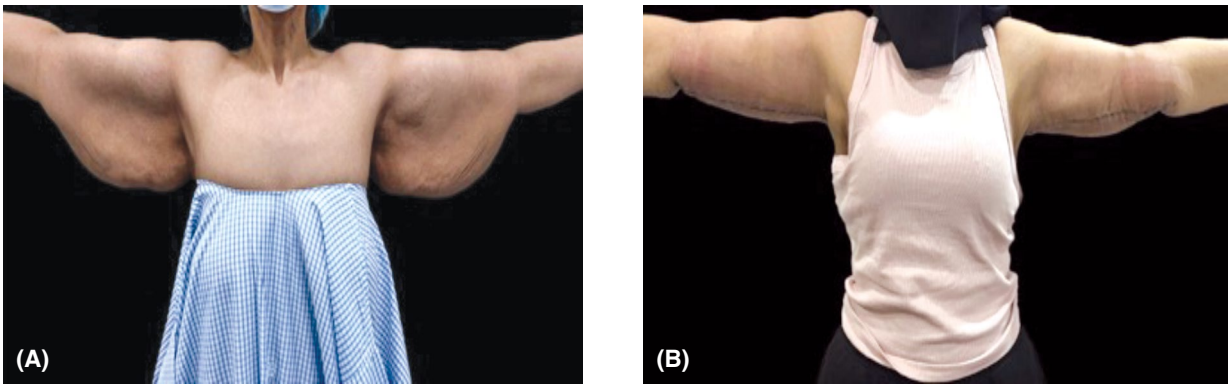

Fig. (2): (A) Pre-operative photograph of patient showing bilateral lipodystrophy of the arm, (B) Post-operative follow-up.

Case (2) was explained in Fig. (3).

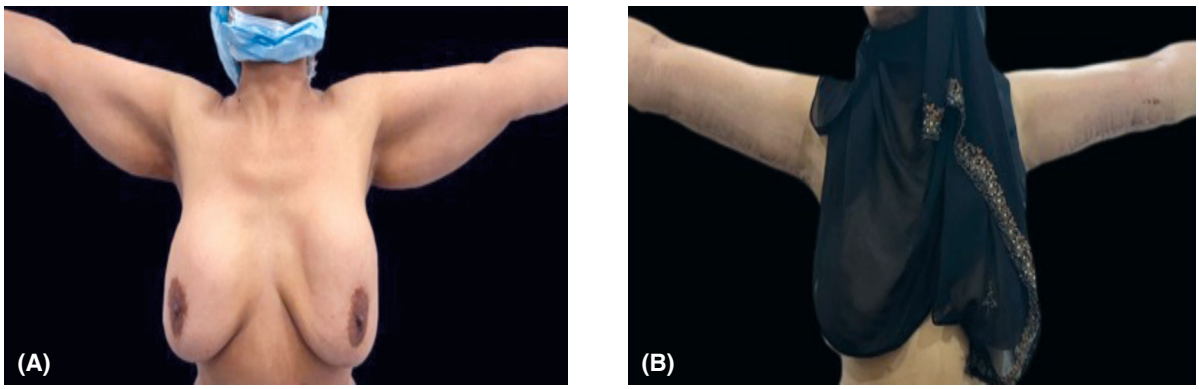

Fig. (3): (A) Pre-operative view of bilateral lipodystrophy of the arm, (B) Early post-operative view of a female patient after bilateral brachioplasty.

Case (3) was explained in Fig. (4).

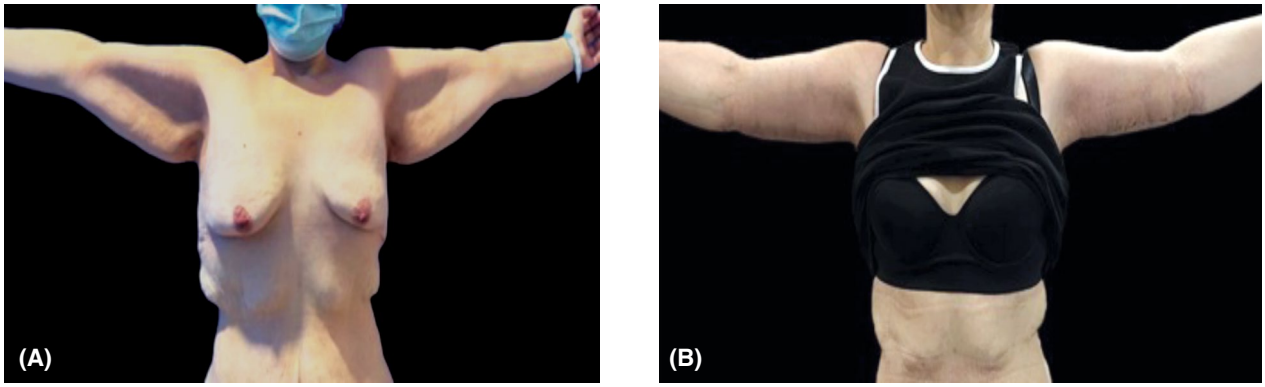

Fig. (4): (A) Pre-operative view of patient showing bilateral lipodystrophy of the arms afte, (B) Post-operative result.

Case (4) was explained in Fig. (5).

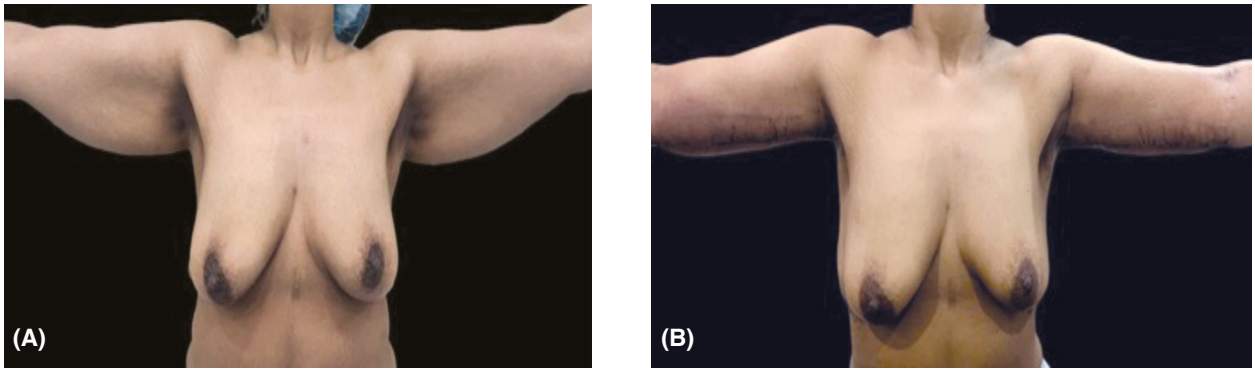

Fig. (5): (A) Pre-operative photograph showing bilateral lipodystrophy of the arm, (B) Post-operative follow-up.

Case (5) was explained in Fig. (6).

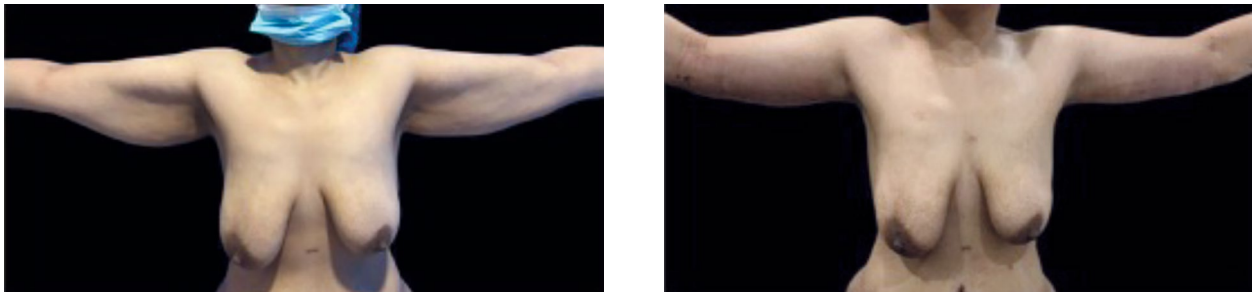

Fig. (6): Pre-operative photograph showing bilateral lipodystrophy of the arm, Post-operative follow-up.

Case (6) was explained in Fig. (7).

Fig. (7): Pre-operative photograph showing bilateral lipodystrophy of the arm, Post-operative follow-up.

Case (7) was explained in Fig. (8).

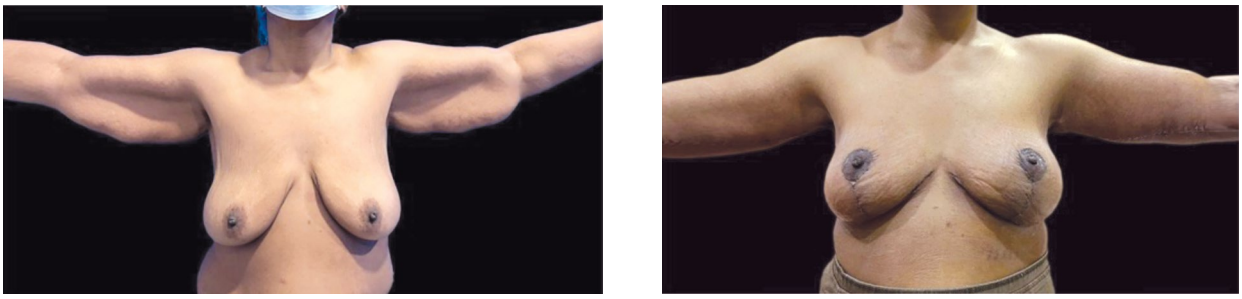

Fig. (8): Pre-operative photograph showing bilateral lipodystrophy of the arm, Post-operative follow-up.

Fig. (9): 1 year postoperative follow-up of Post sleeve patient showing the extension of post-operative scar in the axilla and latera chest wall.

Discussion

This current study demonstrated an exceptionally high success rate of 92.5% among 40 female patients who underwent extended brachioplasty with posterior axillary extension. The satisfaction metrics revealed that 75% of patients reported being satisfied or very satisfied with their surgical outcomes. This represents a favorable result when compared to similar studies in literature. El-Sabbagh **[18]** reported that only 53.8% of patients found their surgical improvement acceptable following mini-incision brachioplasty, suggesting that our extended technique may offer superior aesthetic outcomes. Furthermore, our results align with those reported by Boccara et al. **[19]**, who noted a 75.5% satisfaction rate with aesthetic outcomes using an M-Y axilloplasty technique in a larger cohort of 159 women. Interestingly, Elkhatib **[20]** reported an exceptional satisfaction rate of 88.8% with the M-Y axilloplasty technique, which exceeds our findings. Modolin et al. **[17]** reported that approximately 90% of patients were satisfied with their results, citing improved ease of dressing, reduced arm weight, and absence of edema as the most rewarding outcomes. These functional improvements may be key factors influencing overall satisfaction.

CINTRA JUNIOR, reported that Most patients were satisfied with the results (81.81%) and the outcome that was most appreciated was the ability to wear lighter clothing. Of six dissatisfied patients (18.2%), one complained about a hypertrophic scar and the other about the asymmetry between limbs, complications inherent to the surgical procedure. Four patients reported excess skin as the cause of dissatisfaction **[21]**.

In this current study, a remarkably low seroma incidence of 2.5% was reported which compares favorably with rates reported in the literature. Aljerian et al. **[22]** identified a seroma incidence of 5.91% in their meta-analysis of 1,578 patients, while Boccara et al. **[19]** reported a 3.8% rate in their cohort of 159 patients. Sisti et al. **[23]** also highlighted seroma as one of the most common complications in their review of 1,065 patients. The lower rate observed in our study might be attributed to precise surgical technique, and appropriate postoperative compression.

Hurwitz and Jerrod **[24]** reported only one seroma requiring aspiration among their last 30 treated arms using the L-brachioplasty technique with excision site liposuction.

In this current study, a 7.5% incidence of mild wound dehiscence was reported, which is comparable to the 6.81% rate identified in Aljerian et al.'s **[22]** outcomes. Boccara et al. **[19]** reported a slightly higher rate of 10% in their cohort. Hurwitz and Jerrod **[23]** mentioned minimal incision dehiscence (less than 1cm) in five patients out of 30 arms treated using their L-brachioplasty technique with barbed suture closure.

The incidence of hypertrophic scarring in our study was 27.5%, which is notably higher than rates reported in the literature. Sisti et al. **[23]** identified hypertrophic scarring as one of the most common complications in their review, but specific incidence rates were not provided. Elkhatib **[20]** reported that only 2.4% of patients experienced hypertrophic scars that required management with silicone gel. Boccara et al. **[19]** noted that 18.2% of patients expressed dissatisfaction due to hypertrophic or enlarged scars, which is lower than our reported rate.

This current study reported temporary numbness of the skin of the medial aspect of the arm in 15% of patients. This is significantly higher than the 2.47% incidence of nerve-related complications reported in Aljerian et al.'s **[22]** study and the 0.5% incidence of dysesthesia reported by Elkhatib **[20]**. Sisti et al. **[23]** noted nerve damage in 1.5% of patients (16/1,065) in their comprehensive review. Boccara et al. **[19]** reported no paresthesia in their cohort using the M-Y axilloplasty technique, suggesting that certain technical modifications might help preserve sensory function.

This current stu, the reported residual laxity after resolution of edema was 7.5%, which aligns closely with the 7.79% incidence of recurrence identified in Aljerian et al.'s **[22]** research. Elkhatib **[20]** reported that 2.9% of patients required revision for skin laxity, which is lower than our reported rate. Hurwitz and Jerrod **[24]** noted no significant secondary skin reductions were required in their cohort, suggesting superior long-term tissue support with their technique.

This study's retrospective, single-arm design lacks a control group, potentially biasing outcomes. The single-center and small sample size limit generalizability. A six-month follow-up may miss long-term complications or scar maturation. Surgeon-specific techniques, though standardized, may influence results.

Conclusions:

Extended posterior axillary incision brachioplasty demonstrates high success and satisfaction rates. While complications remain with limited incidence, particularly hypertrophic scarring, this technique provides effective aesthetic results with acceptable morbidity, enhancing upper arm contouring, removes the most excess tissue and fat and decrease the presence of dog ears, bulkiness or crumpling as it addresses laxity on the arms and sides of the chest.

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