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ORIGINAL ARTICLE

Evaluation of Liposuction of Three Zones of The Arm and Fat Transfer to Bicipital Triangle without Skin Excision in Grade 1 and 2 Brachioplasty

Alaa Nabil Elsadek, Mohammad Reda Ahmad, Ahmed Atef Samih Ahmed*
Plastic &Reconstructive Surgery Department, Faculty of Medicine, Zagazig University, Zagazig, Egypt
Corresponding author*:
Ahmed Atef Samih Ahmed
Email: tuvas5264@gmail.com

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ABSTRACT:

Background: Liposuction of three zones of the arm and fat transfer to the bicipital triangle without skin excision is an advanced technique designed for patients with Grade 1 and 2 brachial ptosis. The present work aimed to evaluate the results of brachioplasty using both liposuction of three zones of the arm and fat transfer to bicipital triangle without skin excision and to present alternative solution for brachioplasty without scar.

Methods: In a prospective case series study, 12 patients who presented with brachial ptosis grade 1 and 2 seeking arm contouring were included, they undergone using both liposuction of three zones of the arm and fat transfer to bicipital triangle without skin excision resolving brachial ptosis. Operative data early post-operative state, severity of pain, need for analgesia, early post-operative complications, as well as patients satisfaction were recorded.

Results: The mean of right-side ptosis was 6.5 ± 1.38 preoperatively and significantly reduced by (53.2%) to 3.04 ± 1.08 postoperatively Also, the mean of left-side ptosis was 6.46 ± 1.05 preoperatively and significantly reduced by (56.3%) to 2.82 ± 1.29 postoperatively.We also found a significant reduction in mid arm circumference as the mean of the right mid-arm circumference was 38.1 ± 3.21 preoperatively and significantly reduced by (13.9%) to 32.8 ± 2.55 postoperatively (P<0.001). Also, the mean of left mid-arm circumference was 37.8 ± 3.43 preoperatively and significantly reduced by (13.5%) to 32.7 ± 2.86 postoperatively. the most frequently detected complications were hematoma, seroma and edema which were detected among (16.7%) of the patients, while the least frequently detected complications were fat necrosis and cellulitis which were detected among (8.3%) of the patients. while none of the patients experienced numbness.

Conclusions: Liposuction of the three zones and fat transfer to bicipital triangle provides a safe, effective, and time-saving approach, characterized by high patient satisfaction and fewer complications. Given, its consistent delivery of excellent surgical outcomes and high patient contentment.

Keywords: Liposuction; Three zones; Fat transfer; Bicipital triangle. Brachioplasty.

INTRODUCTION

The pursuit of aesthetically pleasing arm contour is a common goal among individuals experiencing weight loss with resistant arm fat in arms and arm sagging . Brachioplasty has emerged as a safe and effective procedure for enhancing arm aesthetics, with various innovative techniques and treatment strategies introduced since its initial description in the 1930s [1].

Since the first descriptions of aesthetic brachioplasty in the 1950s, various surgical techniques and treatment algorithms have been proposed for brachial ptosis, surgical treatments for brachial ptosis have included liposuction, excisional surgery, or a combination of these

techniques in a single session or as a staged procedures [2]. Nonetheless, postoperative complication rates of up to 40% have been documented following these procedures, with the most prevalent issues being residual contour deformities and aesthetically unpleasing scarring, such as hypertrophic or broadened scars, as well as scars in unfavorable locations..[3].

Patients with brachial ptosis often exhibit varying degrees of contour depression along the medial aspect of the arm,This depression forms a triangular region situated at the bicipital groove, commonly referred to as the "bicipital triangle." Its apex is approximately 3 cm proximal to the medial epicondyle, with the base extending to the axillaa [4].

Because the addition of volume in brachioplasty can resolve wrinkling and lift tissue, it is presumed that fat grafting to the bicipital triangle could create an aesthetically pleasing contour of the medial arm. Fat grafting also could improve the shape of the posterior arm By lifting and tightening ptotic posterior skin and could obviate excisional surgery and associated wound complications [5].

The observations of the bicipital triangle is incorporated into a novel system for classifying brachial deformities that is based on the following 4 treatment zones: The anteromedial/anterolateral arm, the bicipital triangle, the posteromedial/posterolateral arm and

the para-axillary region [6].

Our new surgical option for patients with mild to moderate brachial ptosis (grades 1, 2) is Brachioplasty by liposuction of three zones of the arm and fat transfer to bicipital triangle without skin incision is a novel surgical treatment for patients with mild to moderate brachial ptosis (ie, grades 1, 2) that combines liposuction and lipofilling of the arm and obviates skin excision [7].

This procedure involves deflation of the ptotic region of the arm (zone 1 and 3) and lipofilling of the bicipital triangle (zone 2). Liposuction of these zones helps to tighten the skin. Fat transfer to zone 2 fills the depression at the bicipital triangle and places upward tension on zone 3, thereby supporting and redraping ptotic skin and restoring a pleasing contour of the arm in patients with grade 2 ptosis [8].

Lipofilling also lifts the posterior ptotic skin of the arm through volumization effects that recruit skin from the deflated region of the posterior arm. Because the subcutaneous space of the bicipital triangle is large, upward tension on the abundant skin excess skin of the posterior arm is unlikely to be problematic [7].

The hypothesis of the study was that doing brachioplasty using both liposuction of three zones of the arm and fat transfer to bicipital triangle without skin incision provides a good alternative solution for avoiding skin incision with its complications regarding scarring and patient dissatisfaction. So, we aimed at this study to evaluate the results of brachioplasty using both liposuction of three zones of the arm and fat transfer to bicipital triangle without skin excision to assess its effectiveness in skin tightening and re draping and in contouring the arm area in patients with grade 1 and 2 brachial ptosis and to present an alternative solution that achieves optimal cosmetic results for brachioplasty without scar.

METHODS

In a prospective case series study, 12 patients who presented with brachial ptosis grade 1 and 2 seeking arm contouring were included. During the study period between february2024 till December 2024; Consent was collected from all patients. The approval for the study was obtained from Zagazig University Hospitals after obtaining approval from the Institutional Review Board (#104/6-Feb-2024) and the research was conducted in accordance with the Helsinki Declaration.

The study included patients presenting with brachial ptosis grades 1 or 2 who were admitted to the Plastic and Reconstructive Surgery Department at Zagazig University Hospitals. These patients sought arm contouring procedures to address aesthetic concerns related to their condition. The inclusion focused on individuals with mild to moderate brachial

ptosis with good skin quality in the arms, ensuring a homogeneous study population for consistent assessment and outcomes.

Exclusion criteria were carefully outlined to maintain the study's focus and prevent confounding variables. Patients who had undergone massive weight loss following bariatric surgery, those with severe brachial ptosis classified as grades 3 or 4, or individuals with a history of previous brachioplasty were excluded. Additionally, patients with coagulopathies, known scarring diseases, or vasculitis were not considered suitable candidates due to the increased risk of complications and poor surgical outcomes. These criteria ensured the safety of participants and the reliability of the study's results.

The demographic data of patients were recorded, including age, sex, occupation, marital status, and special habits. For female patients, menstrual history and lactation details were also documented. Additionally, past medical history, including any previous diseases or surgical operations, was carefully reviewed to ensure comprehensive evaluation and preparation for surgical intervention.

All patients who met the inclusion criteria underwent a thorough general examination. Their weight, height, and BMI were measured and recorded. Local examination focused on assessing the arm's shape, grade of ptosis, fat distribution, arm-to-forearm proportions, and girth of the arm. Routine investigations, including complete blood count (CBC), coagulation profile, liver function tests, and kidney function tests, were performed for all patients. Clinical data were meticulously collected, encompassing symptoms, physical signs, laboratory findings, and radiological results, to ensure a holistic preoperative assessment.

Pre-operative Markings

Each patient was asked to stand with shoulders abducted at 90 degrees, with elbows extended and then flexed at 90 degrees. Preoperative markings were made to identify the four treatment zones of the arm. Zone 1 included the anteromedial and anterolateral regions of the arm. Zone 2 comprised the bicipital triangle, which presented as a contour depression in patients with ptosis grades 1a, 2a, 2b, 3b, 4a, and 4b. Zone 3 covered the posteromedial and posterolateral regions of the arm, while Zone 4 encompassed the lateral pectoral area and the upper back. These markings ensured precision in surgical planning and execution, optimizing the aesthetic outcomes of the procedure.

Surgical technique

Patients were placed under general anesthesia with oral intubation in a supine position, with both arms supported on arm tables and IV cannulas placed in the lower limbs to ensure unobstructed access. A broad-spectrum antibiotic (Ampicillin and Sulbactam) was administered during anesthesia induction. Incisions were made at designated access points for tumescent fluid application using a 3mm cannula in zones 1, 3, and 4, followed by a 20-minute waiting period for epinephrine action. Fat aspiration was performed with a 5mm liposuction cannula, starting from zone 3 and proceeding to zones 4 and 1, targeting both superficial and deep subcutaneous planes. The collected fat was monitored in a sterilized container connected to a negative-pressure suction device, ensuring precision and sterility throughout the procedure.

To enhance surgical efficiency and minimize the time fat remained outside the body, two surgical teams operated simultaneously. The primary surgeon performed liposuction and fat harvesting, while the assistant team strained and filtered the lipoaspirate to remove excess fluid and fibrous tissue before transferring it into 22-gauge, 50ml syringes. Simultaneously, the second team removed residual tumescent solution from the arms and prepared Zone 2 through tunnelization for lipofilling.

Using a 3mm cannula, lipofilling was performed in a retrograde fashion to ensure accurate fat deposition and smooth contouring. Following the procedure, a bilateral arm corset was applied to minimize swelling, support the treated areas, and promote proper healing.

Postoperative

Postoperatively, patients were instructed to keep their arms elevated to reduce swelling and aid healing. Hemoglobin (Hb) and hematocrit (Hct) levels were monitored through complete blood count (CBC) tests to detect any signs of blood loss or anemia. Broad-spectrum antibiotics were administered intravenously for 14 days to prevent infection, while anti-edematous measures were implemented for five days. Patients were closely monitored for upper limb edema, ulnar nerve function, sensation in the medial antebrachial cutaneous (MABC) nerve distribution, bruising, ecchymosis, and hand vascular integrity. Hospitalization lasted between 24 to 48 hours, after which patients were discharged with detailed instructions for home care.

Patients attended follow-up visits weekly for one month and then monthly for five months at the outpatient clinic (OPC). During these visits, they were assessed for improvements or persistence of arm ptosis, arm contour, resolution of bicipital groove depression, and any signs of edema, bruising, or neurological abnormalities. Detailed operative data were recorded, including early postoperative status, pain severity, analgesic requirements, and complications. Additionally, intraoperative parameters such as surgery duration, blood loss, volume of aspirated fat, and complications were documented, along with postoperative factors like hospital stay duration, recovery time, and any observed complications.

Patients were followed up for three to six months to assess relief, satisfaction, and complications, with evaluations conducted by three senior staff members from the Plastic and Reconstructive Surgery Department. Objective assessments included measuring the arm circumference reduction ratio preoperatively and two months postoperatively at a fixed point 10 cm from the acromion process, with the arm positioned at 90-degree abduction. The ptosis elimination ratio was also calculated by comparing pre- and postoperative ptosis degrees to determine the percentage of improvement. Complications, such as burns, wound dehiscence, contour irregularities, and hypertrophic scars, were meticulously documented to ensure comprehensive monitoring of surgical outcomes.

Subjective assessments focused on patient satisfaction, with particular emphasis on arm shape, skin tightening, postoperative pain levels, and the recovery period, including the time taken to resume daily activities. Patient-reported outcomes were gathered using a structured questionnaire administered two months postoperatively, providing valuable insight into overall satisfaction and perceived improvements. This combined approach ensured a thorough evaluation of both clinical and patient-centered outcomes.

Statistical Analysis:

Data was collected, revised, coded, and entered into IBM SPSS Statistics (Version 23.0, IBM Corp., Armonk, NY, USA) for analysis. Qualitative data were summarized using frequencies (n) and percentages (%), while quantitative data were analyzed using measures such as mean, median (for skewed data), standard deviation (SD), inter-quartile range (IQR), and range. Data analysis was performed with a significance level (P-value), where $P > 0.05$ indicated non-significance and $P \leq 0.05$ indicated statistical significance. For comparing two paired quantitative variables within the same group, a paired t-test was used as a parametric test, requiring quantitative data that were randomly selected and normally distributed.

RESULTS

This study included 12 patients presenting with brachial ptosis grade 2, their ages ranged from 27 to 40 years, with a mean ± SD of 33.9 ± 4.5 years. (16.7%) were males and (83.3%) were females. Their BMI ranged from 29.5 to 35 kg/m2 with a mean ± SD of 32.4 ± 1.73 (Table 1).

Table (2) demonstrates a statistically significant reduction in arm circumference among the studied patients postoperatively. The mean right mid-arm circumference decreased by 13.9% from 38.1 ± 3.21 to 32.8 ± 2.55 ($P<0.001$), and the left mid-arm circumference

showed a 13.5% reduction from 37.8 ± 3.43 to 32.7 ± 2.86 ($P<0.001$) These reductions highlight the effectiveness of the procedure in achieving measurable improvements in arm contour.

Table (3) shows a statistically significant reduction in ptosis among the studied patients, as the mean of right-side ptosis was 6.5 ± 1.38 preoperatively and significantly reduced by (53.2%) to 3.04 ± 1.08 postoperatively *(P<0.001)*. Also, the mean of left-side ptosis was 6.46 ± 1.05 preoperatively and significantly reduced by (56.3%) to 2.82 ± 1.29 postoperatively *(P<0.001)*.

The right supernatant fat liposuctioned averaged 638 ± 131.6 ml, while the left averaged 575 ± 172.5 ml. For infranatant fat, the right side averaged 310 ± 126.2 ml, and the left averaged 288 ± 71.1 ml, showing slight variations between sides but overall consistent fat extraction results, the mean of the fat transferred to the right bicipital triangle ranged from 50 to 120 with a mean ± SD of 90 ± 22.2. Also, the mean of the fat transferred to the left bicipital triangle ranged from 50 to 100 with a mean ± SD of 85.8 ± 15.6 (Table 4).

The most frequently detected complications were hematoma, seroma and edema which were detected among (16.7%) of the patients, while the least frequently detected complications were fat necrosis and cellulitis which were detected among (8.3%) of the patients. while none of the patients experienced numbness, the total satisfaction score ranged from 15 to 28 with a mean ± SD of 23.2 ± 3.83 (Table 5).

Table 1: Demographic data among the studied patients

Variables		**All patients (n=12)**
Age *(years)*	*Mean ± SD*	33.9 ± 4.5
	Range	(27 – 40)
Sex *(n. %)*	Male	2 (16.7%)
	Female	10 (83.3%)
BMI(kg/m^2)	*Mean ± SD*	32.4 ± 1.73
	Range	(29.5 – 35)

Table 2: Comparison between pre- and postoperative arm circumference among the studied patients

Variables		**Pre-operative (n=12)**	**Post-operative (n=12)**	**% of change**	**P Value**
Right mid-arm circumference	*Mean ± SD*	38.1 ± 3.21	32.8 ± 2.55	↓13.9%	**<0.001**
	Range	(34 – 44)	(30 – 37)		
Left mid-arm circumference	*Mean ± SD*	37.8 ± 3.43	32.7 ± 2.86	↓13.5%	**<0.001**
	Range	(32.5 – 43)	(28.5 – 36.5)		

**Paired sample T-test, Non-significant: P >0.05, Significant: P ≤0.05*

Table 3: Comparison between pre- and postoperative ptosis among the studied patients

Variables		Pre-operative (n=12)	Post-operative (n=12)	% of change	P Value
Right ptosis *(cm)*	*Mean ± SD*	6.5 ± 1.38	3.04 ± 1.08	↓53.2%	**<0.001**
	Range	(4 – 8)	(2 – 6)		
Left ptosis *(cm)*	*Mean ± SD*	6.46 ± 1.05	2.82 ± 1.29	↓56.3%	**<0.001**
	Range	(4.5 – 7.5)	(1.5 – 6)		

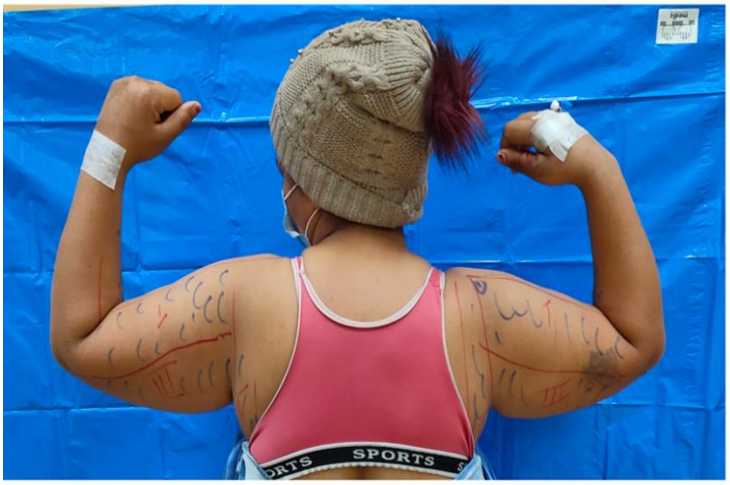
**Paired sample T-test, Non-significant: P >0.05, Significant: P ≤0.05*

Table 4: Fat liposuced and Fat transferred to the bicipital triangle among the studied patients

Variables		All patients (n=12)
Right supernatant	*Mean ± SD*	638 ± 131.6
	Range	(400 – 800)
Left supernatant	*Mean ± SD*	575 ± 172.5
	Range	(300 – 800)
Right infranatant	*Mean ± SD*	310 ± 126.2
	Range	(100 – 500)
Left infranatant	*Mean ± SD*	288 ± 71.1
	Range	(150 – 400)
Variables		**All patients (n=12)**
Fat transferred to the right bicipital triangle	*Mean ± SD*	90 ± 22.2
	Range	(50 – 120)
Fat transferred to the left bicipital triangle	*Mean ± SD*	85.8 ± 15.6
	Range	(50 – 100)

Table 5: Complications and Patient satisfaction score system among the studied patients

Variables		All patients (n=12)
Hematoma		2 (16.7%)
Seroma		2 (16.7%)
Fat necrosis		1 (8.3%)
Cellulitis		1 (8.3%)
Numbness		0 (0%)
Edema		2 (16.7%)
Total satisfaction score	*Mean ± SD*	23.2 ± 3.83
	Range	(15 – 28)



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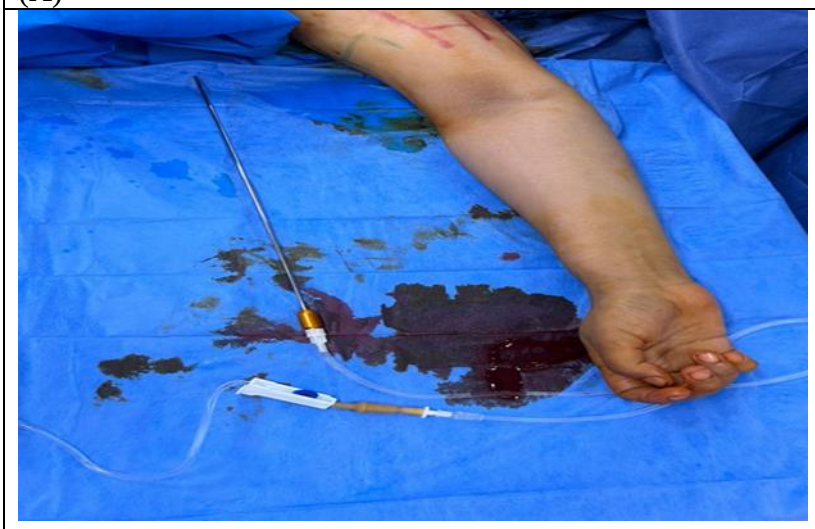

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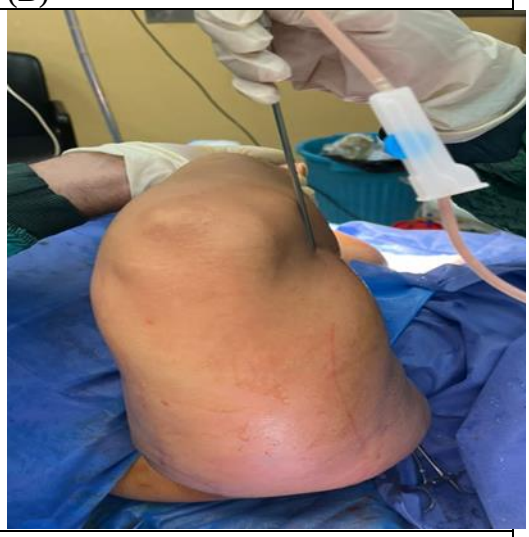

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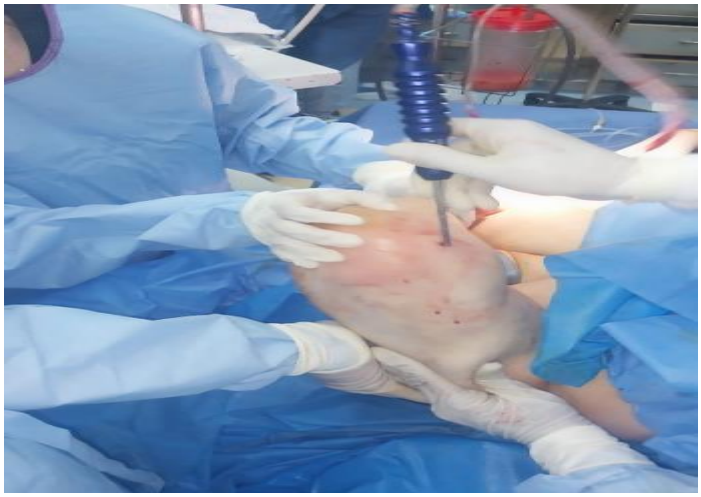

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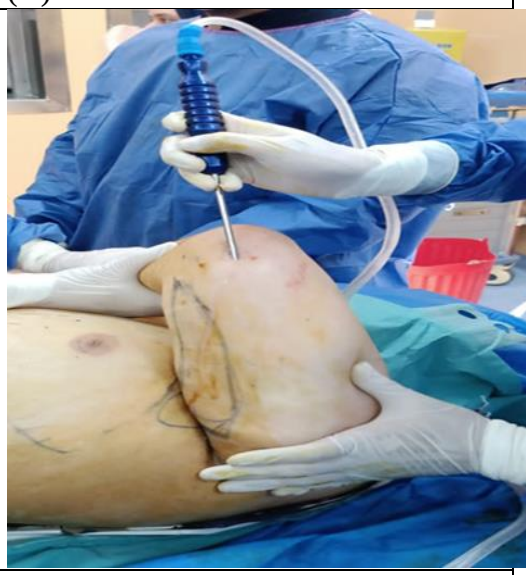

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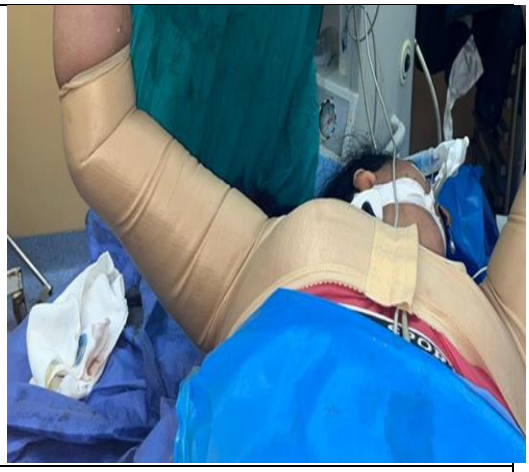

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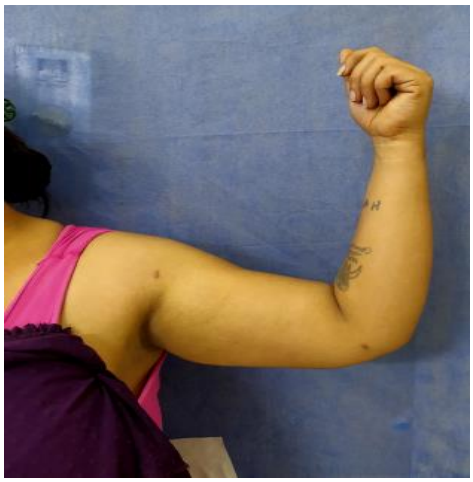

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Figure 1: procedure for liposuction of three zones of the arm and fat transfer to the bicipital triangle without skin excision A) Preoperative Markings for Liposuction and Fat Transfer in Grade 1 and 2 Brachioplasty, B) marking of bicipital triangle in which fat is transferred , C.D) Tumuscent application to different zones of the arm , E)Intraoperative Liposuction Procedure, F)The intraoperative use of liposuction device during arm contouring, G)Fat Transfer to the Bicipital Triangle, H) Immediately postoperative, bilateral arm corset was applied to the patient. I,J) Post operative result after 2 months

DISCUSSION

The brachioplasty procedure has evolved through multiple technical modifications, all aimed at improving outcomes concerning scar formation and arm contour. Different authors advocate various approaches, but most agree that postoperative scarring remains the primary source of patient complaints , and there is still no consensus on the optimal scar location [9].

In 1998, Teimourian and Malekzadeh introduced a useful classification system. El Khatib later proposed standard treatments for each subtype of arm contouring. Types I and IIa of this classification include patients with minimal-to-moderate fat excess and skin laxity, where single or repeated liposuction is recommended. However, most patients in the USA present with stages IIb, III, or IV, requiring brachioplasty for optimal results. Many patients remain hesitant about undergoing brachioplasty due to the visibility of a long scar, often opting out of treatment. While liposuction alone can address fat excess, it may fail to improve the aesthetic appearance of the unclothed upper arm

due to persistent skin laxity and contour irregularities [10].

Over recent decades, advancements in liposuction technologies and fat transfer techniques have aimed to meet patient expectations for enhanced efficacy, safety, and minimal scarring. Innovations such as internal ultrasound-assisted liposuction, power-assisted liposuction, and laser-assisted liposuction (LAL) have been introduced to improve outcomes [10].

A novel surgical approach combining liposuction and fat transfer without skin excision was introduced for patients with mild to moderate brachial ptosis (grades 1 and 2), showing promise in reducing scarring while achieving desirable cosmetic results [11].

In our study, we evaluated the outcomes of brachioplasty using liposuction across three arm zones combined with fat transfer to the bicipital triangle, avoiding skin excision. This approach was assessed as a potential alternative to traditional brachioplasty, offering reduced scarring and improved cosmetic outcomes.

This prospective study included 12 patients with grade 1 and 2 brachial ptosis, aged between 27 and 40 years, with a mean ± SD of 33.9 ± 4.5 years. Of the participants, 16.7% were male, and 83.3% were female. Their BMI ranged from 29.5 to 35 kg/m², with a mean ± SD of 32.4 ± 1.73. These findings align with previous research, such as El-Fahar et al. [12], who studied 28 patients aged 23–42 years (mean ± SD: 33.9 ± 5.7) with a BMI range of 25–35 kg/m² (mean ± SD: 30.9 ± 5). However, unlike our study, their patients had varying degrees of ptosis, including class IIA (2 cases), IIB (16 cases), and III (10 cases) based on El-Khatib's classification.

Our results demonstrated a significant reduction in arm circumference across all measured zones. The right mid-arm circumference was reduced by 13.9% (from 38.1 ± 3.21 to 32.8 ± 2.55, $P<0.001$), and the left mid-arm by 13.5% (from 37.8 ± 3.43 to 32.7 ± 2.86, $P<0.001$). Similarly, El-Fahar et al. [12] reported a reduction in mid-arm circumference from 43 ± 2.8 cm to 32.9 ± 1.8 cm, with a mean reduction of 10.1 ± 1.2 cm (23.5%).

Tetamenzi et al. [13] also observed a reduction in upper limb circumference from 27.3 cm pre-treatment to 23.55 cm at six months post-treatment. These results collectively highlight the effectiveness of arm contouring procedures in achieving significant reductions in arm circumference across different techniques.

Our study demonstrated a significant reduction in ptosis among patients. The mean right-side ptosis decreased by 53.2% from 6.5 ± 1.38 cm preoperatively to 3.04 ± 1.08 cm postoperatively ($P<0.001$), while the mean left-side ptosis decreased by 56.3% from 6.46 ± 1.05 cm to 2.82 ± 1.29 cm ($P<0.001$). These results align with findings from Fayek et al. [14], who reported preoperative arm ptosis in their laser-assisted liposuction group ranging from 6 to 9.5 cm (median: 7 cm; interquartile range: 6–8 cm) and postoperative ptosis ranging from 0 to 4 cm (median: 0.5 cm; interquartile range: 0–1 cm).

Additionally, our study observed fat extraction results showing that the right supernatant fat ranged from 400 to 800 ml, with a mean ± SD of 638 ± 131.6 ml, and the left supernatant fat ranged from 300 to 800 ml, with a mean ± SD of 575 ± 172.5 ml. For infranatant fat, the right side ranged from 100 to 500 ml, with a mean ± SD of 310 ± 126.2 ml, while the left side ranged from 150 to 400 ml, with a mean ± SD of 288 ± 71.1 ml. These findings are consistent with Liu et al. [15], who reported mean lipoaspirate volumes of 660 ml (range: 600–730 ml) for the right arm and 663 ml (range: 600–735 ml) for the left arm. Similarly, Abboud et al. [11] reported a mean lipoaspirate volume of 240 ml per arm (range: 0–450 ml), highlighting variability in fat extraction volumes across different techniques and patient groups.

But in both previous studies they didn't classify the aspirated fat into supranatant and infranatant.

In our novel study, the mean of the fat transferred to the right bicipital triangle ranged from 50 to 120 with a mean ± SD of 90 ± 22.2. Also, the mean of the fat transferred to the left bicipital triangle ranged from 50 to 100 with a mean ± SD of 85.8 ± 15.6.

Similar to the findings of Abboud et al. [11], our study observed a mean fat transfer volume of 100 ml to the bicipital triangle, with a range of 0–220 ml. Regarding complications, the most commonly detected issues were hematoma, seroma, and edema, affecting 16.7% of patients. Seroma and hematoma cases were effectively managed through sonar-guided local aspiration under local anesthesia, with complete healing and no resulting contour irregularities or hyperpigmentation. Edema, primarily caused by an overly tight corset, was resolved by adjusting the corset size and administering appropriate medical treatment. Both complications were short-lived and did not disrupt the patients' daily routines.

Less frequent complications included fat necrosis and cellulitis, observed in 8.3% of patients. These were treated by dilating the liposuction access points, draining exudates using compression, and administering strong antibiotics. This approach resulted in complete resolution without scarring, hyperpigmentation, or contour irregularities. Notably, none of the patients experienced numbness, as the surgical approach carefully respected the anatomical planes and avoided significant nerves in the surgical field, including the ulnar nerve and the medial antebrachial cutaneous (MABC) nerve.

In comparison to our study, Tettamenzi et al. [13] reported seroma formation in 1.6% of patients, fat necrosis in 4.2%, and residual skin laxity requiring revision surgery in 13.3% of cases. Such complications were not observed in our study, likely due to accurate patient selection, appropriate liposuction tailored to skin condition, and the upward lifting effect of fat transferred to the bicipital triangle. Similarly, Fayek et al. [14] documented four cases of residual ptosis and two cases of seroma, whereas no residual ptosis was encountered in our study. However, consistent with our results, no neurological complications were reported in Fayek et al.'s findings.

In Abboud et al. [11], 9.5% of patients required revision surgery due to residual ptosis and persistent wrinkling, particularly in the posterior proximal arm and para-axillary areas. This was attributed to the inclusion of patients with Grade 3b ptosis, unlike our study, which focused solely on Grades 1 and 2. Conversely, Liu et al. [15] reported minor complications, including early postoperative local hardness and tenderness (0.8%), local pain or numbness (0.6%), mild hyperpigmentation at incision sites (0.6%), and mild restriction of unilateral upper arm adduction (0.4%). These complications were not observed in our study, highlighting the importance of precise surgical techniques and patient selection. In conclusion, our study achieved a high satisfaction rate, with total satisfaction scores ranging from 15 to 28 and a mean ± SD of 23.2 ± 3.83, reflecting favorable aesthetic and functional outcomes.

In alignment with our study, Fayek et al. [14] compared laser-assisted liposuction with traditional brachioplasty and found higher patient satisfaction in the liposuction/laser skin tightening group (Group A), with scores ranging from 15 to 29 (median: 26; interquartile range: 22–28). In contrast, the traditional brachioplasty group (Group B) had scores ranging from 13 to 27 (median: 20; interquartile range: 16–23). These findings support our results, showing higher satisfaction with liposuction and fat remodeling compared to traditional skin excision techniques. Similarly, El-Fahar et al. [12] reported that 85.71% of patients were very satisfied, and 14.29% were satisfied with their results.

Consistent with these findings, Tettamenzi et al. [13] used the "Body-Q Satisfaction with Upper Arm" questionnaire and reported an average satisfaction score of 87% at six months postoperatively. In contrast, Abboud et al. [11] found that while 8.4% of patients did not complete their six-month postoperative questionnaire, 89.6% of those who did expressed satisfaction with their arm contour results. Notably, in our study, all patients completed the satisfaction questionnaire, reinforcing the reliability of our reported mean satisfaction score of 23.2 ± 3.83. These consistent findings across studies emphasize the effectiveness and patient preference for liposuction and fat remodeling techniques in achieving desirable aesthetic outcomes.

In the study by Liu et al. [15], an overall satisfaction rate of 99.0% was reported, further reinforcing the high level of patient contentment associated with liposuction and fat remodeling techniques. When comparing our study results with findings from other studies in the literature, strong evidence emerges advocating for higher patient satisfaction when liposuction modalities and fat remodeling are used to address brachial ptosis, as opposed to traditional brachioplasty with skin excision.

Ultimately, our results emphasize the importance of selecting the right candidates for brachioplasty using liposuction combined with fat transfer to the bicipital triangle. This approach not only achieves the same objective outcomes as traditional brachioplasty but does so with fewer complications and significantly higher patient satisfaction, underscoring its value as an effective and preferable alternative for suitable patients.

Conclusions: Brachioplasty by liposuction of 3 zones of the arm and fat transfer to bicipital triangle in which The ptotic brachial region is delineated into 4 zones that are treated by liposuction or lipofilling achieves an aesthetically pleasing contour and is associated with minimal complications, The bicipital triangle (zone 2) is addressed by lipofilling to improve retraction and redraping of the ptotic skin at the posterior arm .Liposuction and fat transfer yield satisfactory results for patients with

mild to moderate (grades 1, 2,) brachial ptosis and eliminate the need for excisional surgery.Liposuction of the three zones and fat transfer to bicipital triangle provides a safe, effective, and time-saving approach, characterized by high patient satisfaction and fewer complications. Given, its consistent delivery of excellent surgical outcomes and high patient contentment.

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