

## Superior Pedicle Reduction Mammoplasty: A Safe and Reliable Technique in Breast Hypertrophy

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### ABSTRACT

**Objectives:** The aim of this study is to evaluate the superior pedicle technique in reduction mammoplasty of breast hypertrophy.

**Background:** Breast reduction is a common aesthetic surgical procedure. It aims not only at bringing the size of the breast proportionate to the build of the individual, but also to decrease the discomfort caused by massive, ill-shaped and hanging breasts. The operative procedure reduces the breast tissue mass and enhances aesthetic appearance. No technique has been shown to be superior. The superior pedicle technique preserves superior and medial breast fullness while providing appropriate resection of the breast parenchyma to reduce symptoms and produce a smaller, lifted breast with more youthful appearance.

**Patients and Methods:** We performed a retrospective chart review of eighty (80) consecutive patients between September 2015 and October 2019. All the patients underwent bilateral breast reductions. Preoperative assessment including history, physical examination, breast ultrasound and mammography. Also preoperative breast measurements, mainly mid-clavicle point to NAC distance were taken. Standard breast photography was also carried out preoperative and 4 weeks postoperative. All patients were followed 1, 3 and 6 months postoperative for complications and patient satisfaction.

**Results:** Patient's age ranged from 20 to 55 years old. About 71.3% of the patients complained of preoperative physical problems. The mean distance from mid-clavicle to nipple in our cases was 33.2 (19-39) cm. The mean length of nipple transposition was 13.2cm, ranging from 3 to 18cm. The mean weight of breast tissue resection was 924g, ranging from 190 to 1800g. The overall postoperative complications were 20%, in the form of T-junction wound dehiscence (10%), mild soft tissue infection (3.8%), asymmetry (2.5%), unilateral partial NAC necrosis (2.5%) and unilateral complete NAC necrosis (1.3%). 91.3% of the cases were satisfied, 5% acceptable and 3.8% dissatisfied regarding improvement of symptoms and size, shape and symmetry of the breasts.

**Conclusion:** The superior pedicle technique is simple, safe and reliable technique in reduction mammoplasty with maintaining upper and medial fullness and giving good aesthetic results.

**Key Words:** Superior pedicle – Reduction mammoplasty.

### INTRODUCTION

One of the most common procedures performed by plastic surgeons is reduction mammoplasty [1]. It is one of the most difficult fields of aesthetic surgery, due to many surgical procedures and different guidelines defining the aesthetically perfect breast [2].

Large breasts can cause a lot of distress for patients. Breast pain, ulceration of the skin on mammary creases, postural problems, and related back pain can occur. These all affect the social life of the patients [3]. Patients with breast hypertrophy benefit from a reduction in breast size, as many symptoms are relieved by breast reduction. Goals of the surgery are to improve pain, emotional and psycho-social discomfort with preservation of a stable conical-shaped breast [4,5].

Many surgical approaches are available for breast reduction with different skin reduction patterns and different parenchyma or dermal support for NAC [6,7]. No technique is superior, however comparison between studies is difficult due to variation in outcome reporting. So the ideal technique remains controversial [8].

The superior pedicle breast reduction, first described by Arie in 1957 [9]. This was followed with some refinements by Ivo Pitanguy [10]. Later, Weiner described the superior based dermal pedicle for reductions and breast lift [11].

This retrospective study aims to evaluate reduction mammoplasty in breast hypertrophy using the superior pedicle technique.

### PATIENTS AND METHODS

A retrospective chart review of eighty (80) consecutive patients performed between September

2015 and October 2019 was done. All patients underwent bilateral breast reductions. Preoperative assessment including history and physical examination, breast ultrasound for all patients and mammography for women above 40 years old. Also preoperative breast measurements, mainly mid-clavicle point to NAC distance were taken. Breast photography (front, right and left views) were also carried out preoperative and 4 weeks after surgery. All patients were followed at 1, 3 and 6 months for complications and aesthetic results. Patient satisfaction was obtained by aesthetic rating scale as follow; (1) Satisfied, (2) Somewhat satisfied/somewhat unsatisfied and (3) Dissatisfied regarding improvement of symptoms, breast shape (superior and medial fullness), breast symmetry, NAC symmetry (size/level) and complication affecting the aesthetic results.

The study was approved by the Ethical Committee of Faculty of Medicine & Health Sciences, Sana'a University.

Preoperative markings were made with the patient standing. The mid-line, meridian and the new nipple position against the infra-mammary fold onto the anterior skin (18-22cm from mid-clavicle line) were marked bilaterally. The markings for the vertical limbs were 8-10cm from the level of the new nipple position, marked as a triangle where the base of this triangle was 8-11cm and the distances were adjusted for each patient. All markings were adjusted as necessary.

*Intra-operative details:* In this study we follow the same operative steps described by Nadeau, et al., [12]. Prophylactic antibiotics were administered before induction of anesthesia. The patient was positioned in the supine position with the arms abducted on the operating table. The breasts were infiltrated with a solution of 250ml of normal saline, 20ml of 2% plain lidocaine and 0.5ml of epinephrine. With the breast under tension, de-epithelialization of the marked triangle was performed, after marking the new areola with a 42-45mm. diameter cookie cutter. A partial-thickness incision was made at the NAC, and the remaining skin incisions were full-thickness. After incising 1cm above the infra-mammary crease, dissection was performed cranially to the level of NAC at the subcutaneous tissue plane over the pectoral's fascia. Then breast tissue was removed 1cm below the level of the NAC. The breast was held medially and dissection with 2cm skin thickness was made to remove the lateral breast tissue. This resection was carried cranially as necessary to remove the appropriate volume for each patient to give good

breast contour. The breast tissue was closed temporarily until reduction of the contralateral side was completed to adjust the size of both breasts. A drain was inserted and secured to the skin (which was removed on third postoperative day), after good hemostasis. Then final closure was achieved. The skin resection for the new position of the NAC at the apex of the vertical limb was marked and excised. The nipple was fixed. Dressing was applied. The removed breast tissue was weighed. The patient wore a surgical brassiere for 8-12 weeks postoperative.

#### *Statistical analysis:*

The data was entered and analyzed using SPSS version 23 and presented using tables and graphs.

## RESULTS

A total of 80 female patients were included in this study. The mean age of the patients was 31.8 (SD 8.9). The mean of the body mass index (BMI) was 38.3 (SD 5.8). Fifty one (63.7%) of the patients were married. The majority of the patients (88.8%) were non-smokers. Fifty seven (71.3%) of the patients were symptomatic, complaining of neck, shoulder and upper back pain (Table 1). The result of ultrasound and mammography were normal in 69 patients, while in 9 patients it showed simple cysts and in 2 patients it showed small fibroadenomas.

Preoperative, the mean distance from the mid-clavicle point to the nipple was 33.2cm. (SD 3.7), 33.1cm. (SD 3.8) of the right and left breast respectively (Table 2).

Intra-operative, the mean length of the nipple transposition was 13.2cm. (SD 3.3), (Table 3).

The mean weight of the breast tissue removed from the right breast was 934.6gm (SD 381.4). It ranged from 180gm-1700gm. While from the left breast it was 924.5 (SD 372.5) and it ranged from 190gm to 1800gm.

There was significant correlation between symptoms and the weight of the breast tissue excised ( $p$ -value <0.001), (Table 4). The overall complications in this study was 20%, including T-junction incision breakdown in 8 patients (10%), mild soft tissue infection in 3 patients (3.8%), asymmetry between both breasts in 2 patients, one was mild asymmetry in the size of the two breasts and another was asymmetry in the site of NAC of the two breasts. In addition to unilateral partial nipple necrosis in 2 patients (2.5%) and unilateral total nipple necrosis in one patient (1.3%), (Table 5).

Table (1): General characteristics of the patients (n=80).

Variable	Mean (SD)	Range (Min., Max.)	N	%
<i>Age (years):</i>	31.8 (8.9)	20.0, 55.0		
20-29			37	46.3
30-39			27	33.8
40-49			10	12.5
50-59			6	7.5
<i>Marital status:</i>				
Single			29	36.3
Married			51	63.7
BMI (kg/m <sup>2</sup> )	38.3 (5.8)	27.5, 51.3		
<i>Smoking:</i>				
Yes			9	11.3
No			71	88.8
<i>Symptoms:</i>				
Yes			57	71.3
No			23	28.7
<i>Ultrasound/mammography:</i>				
Normal			69	86.3
Pathology			11	13.8

Table (2): Mid-clavicular point to NAC distance (cm.) of the studied cases (n=80).

Mid-clavicular point - NAC	Right breast	Left breast
Min. - Max.	19.0-39.0	19.0-39.0
Mean (SD)	33.2 (3.2)	33.1 (3.8)
Median	34.0	34.0

Table (3): Nipple transposition distance of the studied cases (n=80).

Length of nipple transposition (cm.)	Right breast	Left breast
Min. - Max.	3.0-17.0	3.0-18.0
Mean	13.2 (3.3)	13.1 - (3.3)
Median	14.0	14.0

Table (4): Relations of patients' symptoms with the weight of breast tissue excised.

Variable	Symptomatic		Not symptomatic		p-value
	Mean	SD	Mean	SD	
The weight of tissue removed from right breast (gm.)	1058.6	340.0	627.4	299.4	<0.001
The weight of tissue removed from of left breast (gm.)	1043.3	343.0	630.0	267.3	<0.001

Table (5): Postoperative complications (no=80).

Type of complication	Number of patients	%
Wound break down at T-junction	8	10
Soft tissue infection	3	3.8
Asymmetry in breast size and nipple position	2	2.5
Unilateral partial nipple necrosis	2	2.5
Unilateral total nipple necrosis	1	1.3

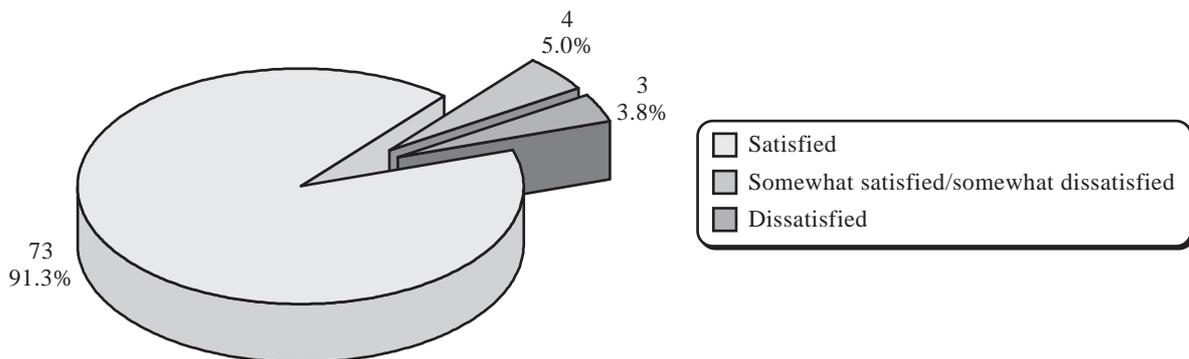


Fig. (1): Patients satisfaction from reduction mammoplasty (no.=80).

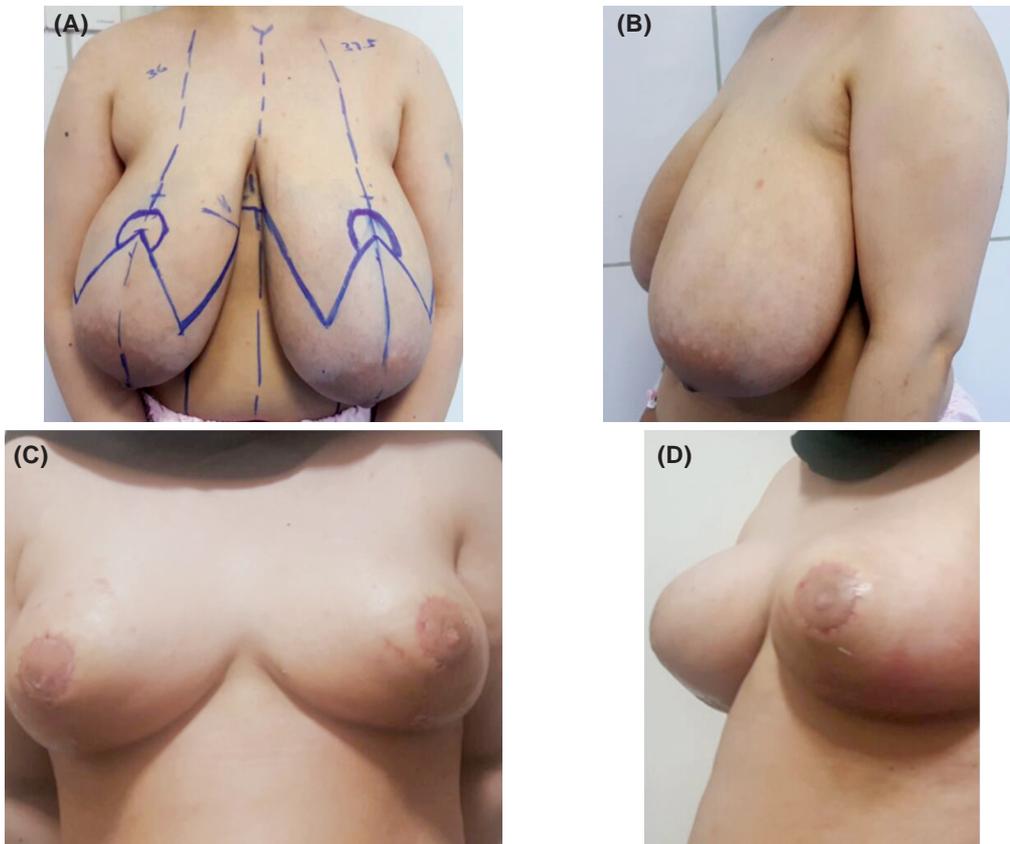


Fig. (2): (A,B) Preoperative anterior and lateral views. (C,D) 6 weeks postoperative anterior and lateral views.

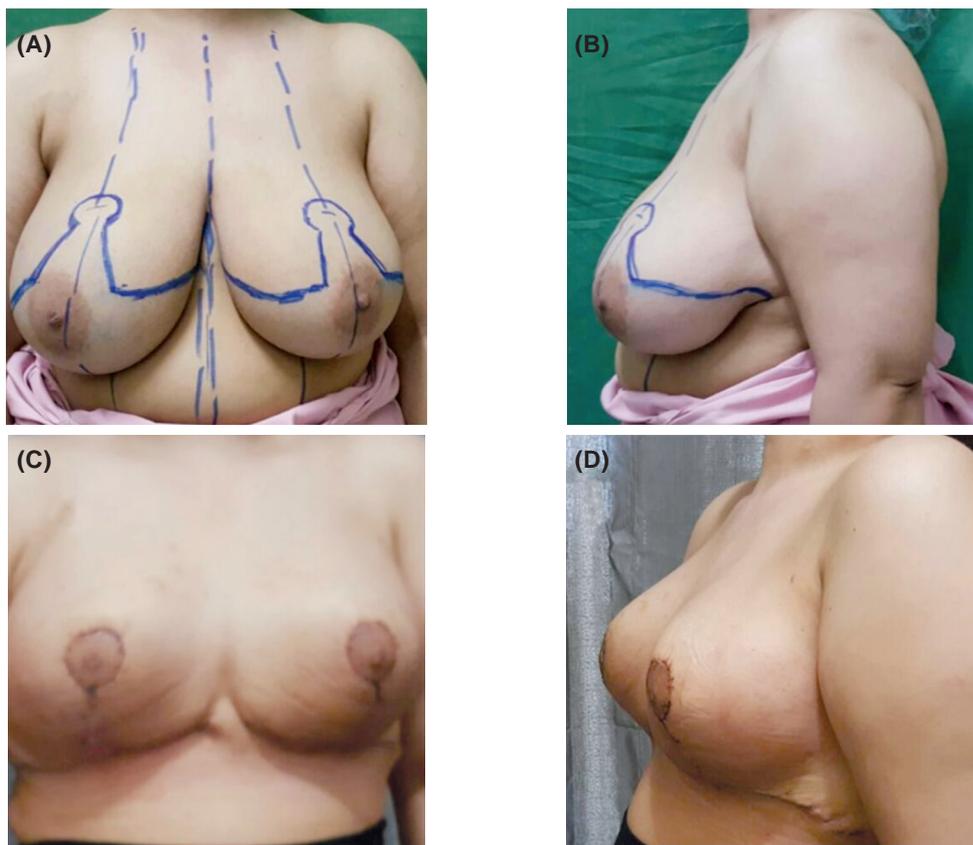


Fig. (3): (A,B) Preoperative anterior and lateral views. (C,D) 4 weeks postoperative anterior and lateral views.

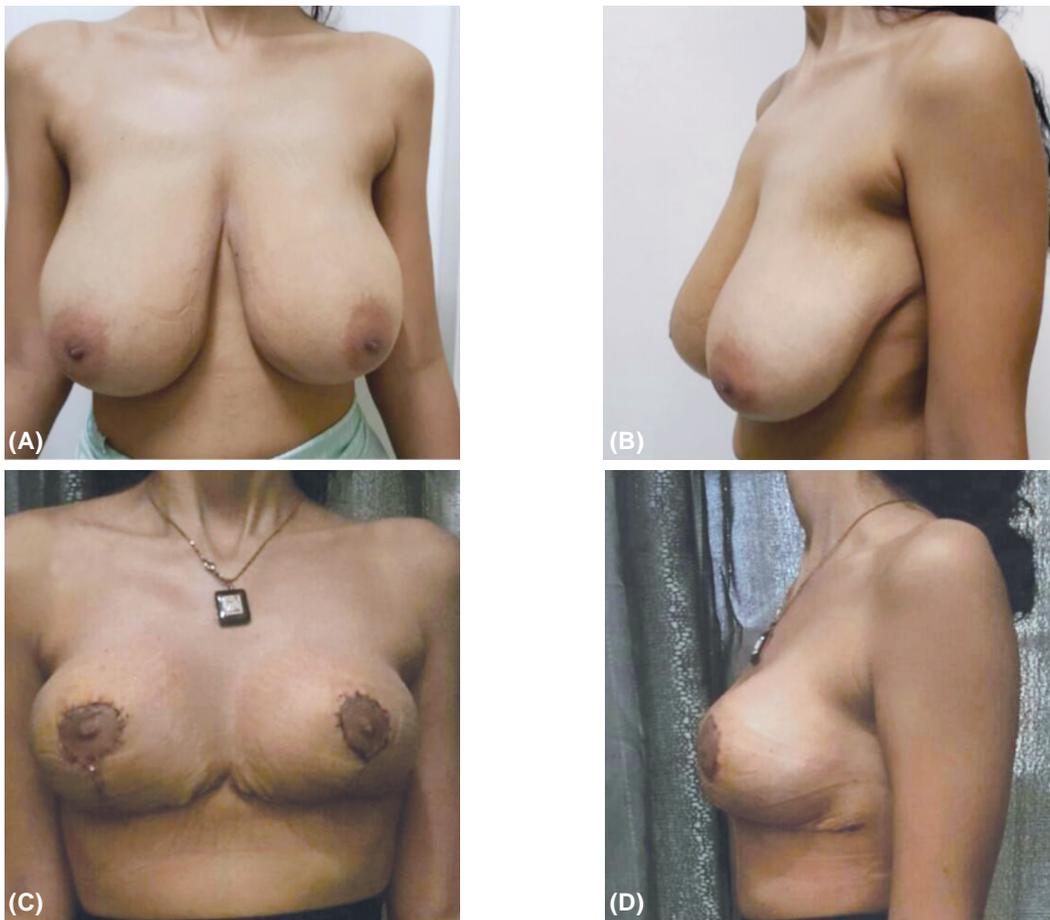


Fig. (4): (A,B) Preoperative anterior and lateral views. (C,D) 3 weeks postoperative anterior and lateral views.

## DISCUSSION

Breast reduction is significantly associated with improvement in quality of life and breast-related symptoms, with improvement in physical and psycho social well-being of patients with large breasts [13]. These benefits persist across differences in patient's age and BMI category. The multiple reduction techniques available indicate that no technique is perfect. There was no single technique suitable for all cases. Defects of these procedures include the loss of long term projection, quality and length of the scars and development of squaring. Several techniques have developed over years, but yet till now, there is no single technique that fulfills all the requirements addressed by the critics [14].

In our study all the symptomatic patients benefit greatly from a reduction in breast size as well as symptoms. These results are similar to other studies. One study documented a 93% improvement in symptoms for moderate to severe bra strap grooves, neck and shoulder pain, and upper back pain [15]. Another study reported that all patients (100%)

experienced reduction of their preoperative pain [16]. There is a significant correlation between the symptoms (neck, shoulder, back pain) of our patients and the weight of breast tissue which was removed with  $p$ -value  $<0.001$  (Table 4), however several authors have noted that the removed tissue weight does not correlate with symptom relief [17-19]. Our results can be explained by that the weight of the removed tissue varies, depending on the glandular/fat component ratio. The more glandular component, the heavier the weight of the removed tissue. The glandular/fat ratio is higher in younger females compared with older females which was noticed in our study in which the majority (80%) of our cases  $<40$  years old (Table 1).

Fox reported the unreliability of the long superior pedicle when used to reduce the size of very large breasts with nipple transposition to a distance of 12cm or more [20], however in our study the superior pedicle technique was used safely for resection of up to 1800g/breast and cephalic NAC transposition up to 18cm., with reliable preservation of the viability of the nipple. These results were reinforced by Wettstein et al., who reported the

safety of the superior pedicle technique with transposition of NAC of approximately 20cm., with the mean preoperative supra-sternum notch to nipple distance of 44cm. and an average resection weight of about 1450g./breast [21]. Also Fino et al., documented in their study when they compared large reduction (more than 2000g per breast) and small reduction (less than 1999g per breast) with superior pedicle technique, that the range distance from the mid-clavicle point to nipple was 33.4 to 53cm, the mean resection weight was 1715g for right breast and 1670g for the left breast without statistically significant differences in the rates of nipple necrosis between the large and small resection [22]. The viability of NAC can't be affected with a long pedicle only but also folding and placement in a newly created site during closure will affect the viability and can lead to nipple necrosis. Also vascular variability plays a role in the extent of ischaemia. Despite the improvement in breast reduction procedures and better understanding of breast circulation, necrosis of the NAC following breast reduction is still reported [23,24]. In our study the overall NAC necrosis was 3.8%, where 2 (2.5%) cases had unilateral partial necrosis and the patients accepted the result, another one (1.3%) case had unilateral total necrosis which was reconstructed later. Ulusal and Alber published that the rate of partial NAC necrosis was 5% and the rate of complete NAC necrosis was 2.5% using superior pedicle technique [25]. In comparison Mandrekas et al., reported 0.8% nipple necrosis [26] versus 6% and 4% by Davis et al., and Dabbah et al., respectively with the inferior pedicle technique [27,28].

The overall complications in our study was acceptable (20%), including wound break down at T-junction (10%) where it healed with secondary healing, mild soft tissue infection (3.8%), asymmetry (2.5%), One case had mild asymmetry in the size between the two breasts and another case there was asymmetry in the position of NAC. In addition to the unilateral partial NAC necrosis (2.5%) and the unilateral complete NAC necrosis (1.3%), mentioned above. We found that the most common complication was the wound break down at the T-junction where it was most likely to occur at the junction of the vertical and transverse incisions, which was the region of maximum tension. In spite of that, the wise pattern still remains the most common skin incision used in large reduction mammoplasty. It allows easy NAC transposition and gives a good result. So careful tissue handling, good flap thickness and less tension closure helped to prevent tissue necrosis from occurring. In comparison, another study stated that the complication

rate in reduction mammoplasty ranged from 7.1% to 53% in the adolescent population [29].

Breast reshaping with superior and medial fullness are great challenge to achieve with high satisfaction and few complications. In our study we focusing on excising more tissue from the lateral breast, which is usually more noticeable than the medial part in large breasts and preservation of the medial breast tissue, this helped us to correct the aesthetic problem of the large breast. The removal of the lateral breast tissue and thinning of the lateral flap leads to correction of the lateral fullness and gives good aesthetic contour. While preservation of the medial tissues creates medial fullness and accentuation of the medial cleavage. We found that the patient satisfaction in our study, regarding improvement of symptoms, symmetry in size and shape (superior and medial fullness), NAC site and size was as follows: 91.3% were satisfied, 5% had an acceptable outcome (somewhat satisfied/somewhat not satisfied) and 3.8% were dissatisfied. This is similar to another study which revealed a 97% satisfaction rate in the patients with the superior pedicle technique [30]. With inferior pedicle technique Baslaim et al., reported that although all the patients were happy about the reduced breast heaviness, their satisfaction with the breast shape and scars was variable where 73% were highly satisfied, 11.5% were satisfied, 7.7% found the results acceptable but were not satisfied and 7.7% were completely dissatisfied [31].

The superior pedicle technique has many advantages. It is simple, easy and reliable. It produces an aesthetically acceptable breast shape, excellent contour with superior and medial fullness. Unlike the inferior pedicle mammoplasty, which was more popular but had unfavorable results with a flattened, boxy shape of breast and lacking projection and volume [32].

#### *Conclusion:*

The superior pedicle technique is a simple, safe and reliable technique in reduction mammoplasty with maintaining superior and medial fullness and giving good aesthetic results with high patient satisfaction.

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