

Improving the Aesthetic Outcome of the Superomedial Pedicle in Wise-Pattern Breast Reduction Using a Suspension “Hammock” Flap Technique

AHMED E. MOHAMED, M.D.; SHERIF M. ABDELMEGEED, M.Sc. and OMAR S. ALI, M.D.

The Department of Plastic Surgery, Faculty of Medicine, Suez Canal University, Ismailia

Abstract

Background: Superomedial pedicle reduction mammoplasty provides satisfactory and symmetrical projection of the lower pole. Its satisfactory outcome cannot be preserved consistently for quite some time. This study describes the combination of superomedial pedicle breast reduction with the “Hammock” flap suspension sling to obtain a satisfactory long-term outcome through pedicle support enhancement and preventing pseudoptosis.

Objective: This study aimed to assess the aesthetic outcome and the possible complications of superomedial pedicle in wise pattern reduction mammoplasty combined with a suspension hammock-flap for additional fixation and stabilisation of the pedicle and to improve the contour and projection of the lower pole.

Methods: Fifteen patients with breast hypertrophy eligible for breast reduction were operated on using a combined superomedial pedicle reduction mammoplasty with a perforator-based inferior advancement “Hammock” flap. The “Hammock flap” fixed to the fascia of pectoralis major muscle and the superomedial pedicle as a hammock. Breast measurements were recorded preoperatively and postoperatively (1, 6, and 12 months). Patients reported their own satisfaction with breast volume, contour, position of the nipple-areola complex (NAC), and projection of the lower pole at the end of the follow-up period through the BREAST-Q Version 2.0 “Reduction/Mastopexy Module Pre- and Postoperative Scales questionnaire”.

Results: Aesthetic outcomes at one-year post-operative were satisfactory in almost all patients, as indicated by BREAST-Q scores, with a low incidence of complication rates. Furthermore, the postoperative breast measurements were nearly constant during the follow-up period.

Conclusion: Hammock flap sling technique, which is performed through an inferior dermo glandular flap, is an approach that is effective and safe approach that can improve

pedicle fixation and positioning. Furthermore, it results in a favorable long-term aesthetic outcome for patients undergoing superomedial pedicle reduction mammoplasty.

Key Words: Breast – Reduction – Hammock – Flap.

Disclosure: The authors have no conflict of interest to declare.

Ethical Committee: The study had the approval of the local Institutional Review Board and the Research Ethics Committee, Faculty of Medicine, Suez Canal University on 20 / 6 / 2023 with the approval code: 5381#. All participants filled a written informed consent to participate in the study.

Introduction

Breast reduction is a popular surgical procedure in aesthetic surgery that can be done using different surgical techniques, pedicle types, and patterns of skin resection [1]. Even so, each of these techniques has its disadvantages. To achieve long-term effects, the most recent techniques depend on parenchymal shaping instead of the realisation of a skin envelope [2]. The typical superomedial breast reduction enables significant reduction of the glandular tissue from the lower pole; however, in extremely large, enormous breasts, this technique is less effective [3].

The combination of wise-pattern skin excision with the superomedial pedicle has grown in favor due to its adaptability and capability to achieve considerable reductions in the parenchyma of the breast and the envelope of the skin with contour improvement. The superomedial pedicle approach improves the upper pole projection, whereas the wise-pattern skin resection approach enables the removal of excess skin in all planes [4]. It enhances both short- and long-term aesthetic results with a low incidence of complications, even in large breast volumes [5].

Correspondence to: Dr. Ahmad El Hussein Mohamed,
E-Mail: rivercruise85@gmail.com

Pseudoptosis is one of the most common drawbacks in wise-pattern breast reduction, especially in the inferior pedicle approach [6]. Although the superomedial pedicle approach decreases the problem of pseudoptosis, the pedicle is supported only by the upper skin flaps, so ptosis of the breast may recur, especially in poor skin-quality patients [6].

This study aimed to assess the aesthetic outcome and the possible complications of superomedial pedicle in wise pattern reduction mammoplasty combined with a suspension hammock-flap for additional fixation and stabilisation of the pedicle and to improve the contour and projection of the lower pole.

Patients and Methods

This was an uncontrolled clinical study that included 15 female patients with breast hypertrophy eligible for breast reduction during the period of time extended up to three years from 2020-2023. The study included female patients aged between 18 and 60 who presented with symptomatic bilateral breast hypertrophy. Females with proven breast cancer confirmed by ultrasound or mammogram, diabetic females, females seeking further pregnancy and breastfeeding, and females with lengthy pedicles who needed to elevate their nipple areola complex by more than 10cm were excluded. All patients had regular follow-up visits at one week, one month, three months, six months, and one-year post-operative. During the one-month, six-month, and 12-month post-operative visits, final measurements were obtained, and the satisfaction of the patient was assessed by the BREAST questionnaire by an independent plastic surgeon who was not involved in any of the operations. The overall complication rate was also assessed.

Pre-operative evaluation:

Enrolled patients were subjected to Version 2.0 of the BREAST-Questionnaire "Reduction/Mastopexy Module Preoperative- and Postoperative Scales [7] to obtain preoperative data about patients physical and psychological status and their degree of breast satisfaction. Preoperative breast measurements such as nipple to nipple (N-N), nipple to suprasternal notch (N-SSN), and nipple to inframammary fold (N-IMF) were also measured.

Technique:

First, the standard pre-operative landmarks for the superomedial pedicle approach in wise-pattern reduction mammoplasty accepted by most surgeons were done. (Fig. 1). Then the "hammock" flap was designed as an inferiorly based dermo-glandular flap on the IMF as an advancement dermo-glandular flap.

The operation proceeded with scoring incisions on the previously marked lateral and medial limb landmarks and surrounding the areola, followed by superomedial flap de-epithelialization, conserving the nipple areola complex (NAC). The ordinary superomedial reduction mammoplasty was done by eliminating the glandular and fatty tissue surrounding the pedicle up to the upper border of the flap. (Fig. 2). The flap was then dissected medially, laterally, inferiorly, and superiorly down to the pectoralis fascia, including perforators of the internal mammary. (Fig. 3-A) [8].

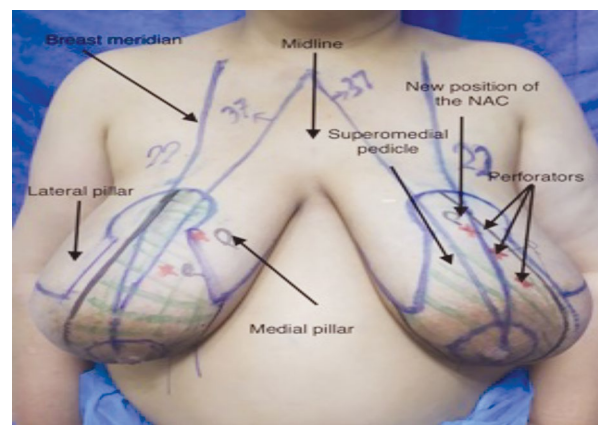
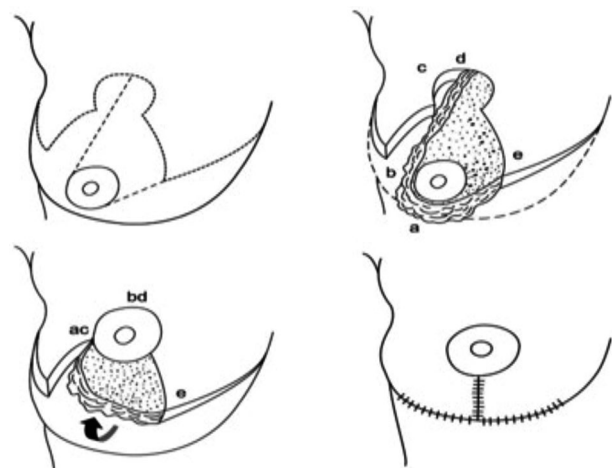


Fig. (1): Preoperative superomedial pedicle reduction mammoplasty marking.



Diagrammatic illustration of the operative technique

Fig. (2): The superomedial pedicle is marked from the centre of the keyhole pattern that represent the new site of the nipple areola complex, including the nipple-areola complex (NAC), to the convergence of the vertical limb and medial limb. (right, upper) The pedicle is then elevated on its perforators and rotated about 90 degrees to be placed in its position (left, lower) so the point (b) on the pedicle meets the point (d) on the new nipple-areola complex position, and concomitantly, the point (a) rotates 90 degrees and is placed to meet the point (c) [8].

After labelling the inframammary fold position, the flap was superiorly and horizontally advanced to the previously dissected superomedial pedicle. (Fig. 3-B). Using an absorbable suture, the flap was then fixed to the fascia, the pectoralis major muscle, usually at the level of the 4th rib like a hammock, and to the superomedial pedicle. Finally, the wound was closed in layers after placing a suction drain. (Fig. 4).

Postoperative care and follow-up:

Patients were evaluated for the aesthetic outcome of the procedure in the form of breast size, projection, superior pole fullness, and symmetry.

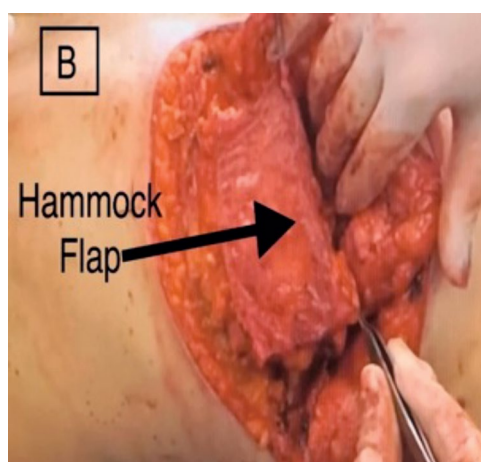
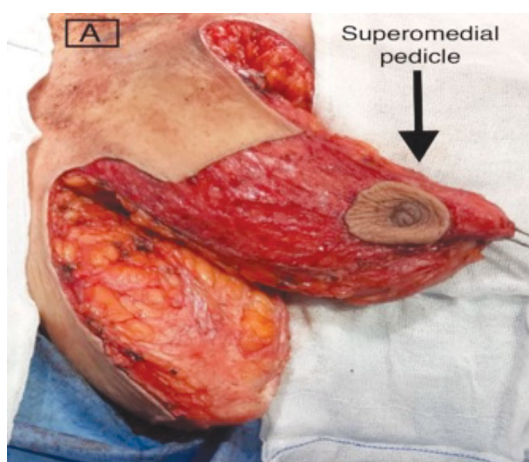


Fig. (3): (A) The superomedial pedicle after being raised, (B) The hammock flap after superior and horizontal advancement.



Fig. (4): The immediate postoperative view.

Results

Overall, 15 females were operated on using the superomedial pedicle in Wise-pattern reduction mammoplasty with the “Hammock” flap suspension technique. Their mean age was 35.53 years, and 73.4% of them were married. They were all non-smokers. (Table 1).

Pre-operative clinical data:

The patient's average body mass index (BMI) was 32.61kg/m², and more than 66.7% of them

Furthermore, patients were followed for the presence of any complications, including nipple areola complex ischemia and necrosis, seroma, hematoma, wound infection, wound dehiscence, and nipple areola complex sensory loss. Patients were assessed one week, one month, three months, six months, and one year post-operatively on regular follow-up visits.

Statistical analysis:

Data was imported into Microsoft Excel and analysed using S.P.S.S. version 11. Through the student *t*-test, statistical significance was determined, with a *p*-value of 0.05 considered significant.

were obese (BMI ≥ 30 kg/m²) (Table 1). Breast measurements that were analysed preoperatively given that the mean pedicle length was 33.07 ± 2.91 cm, 31.3cm was the average preoperative SSN-N distance, and 15.3cm was the average preoperative distance between the IMF and inferior border of the NAC. The distance of the breast segment dropping under the IMF was 8.6 cm, which was considered a sign of ptosis/pseudoptosis (Table 2). The preoperative average score for body image satisfaction was 37.1% (range: 30%-45%). The pre-operative average score for psychological well-being was 25.80% (range: 10%-39%). The pre-operative average score for sexual well-being was 29.8% (range 20-40%). The physical symptoms, including grooving of the bra straps and pain, were reported in 93.3% of the patients. The mean breast satisfaction score before the procedure was 20.9% (range: 15%-30%) (Table 3).

Post-operative outcomes:

In terms of breast measurements following the procedure, they nearly returned to their normal proportions, with the average SSN-N distance being 22.3cm vs. 22.3cm vs. 23.3cm at the one-month, six-month, and one-year follow-ups, respectively. The average lower pole length (IMF to inferior bor-

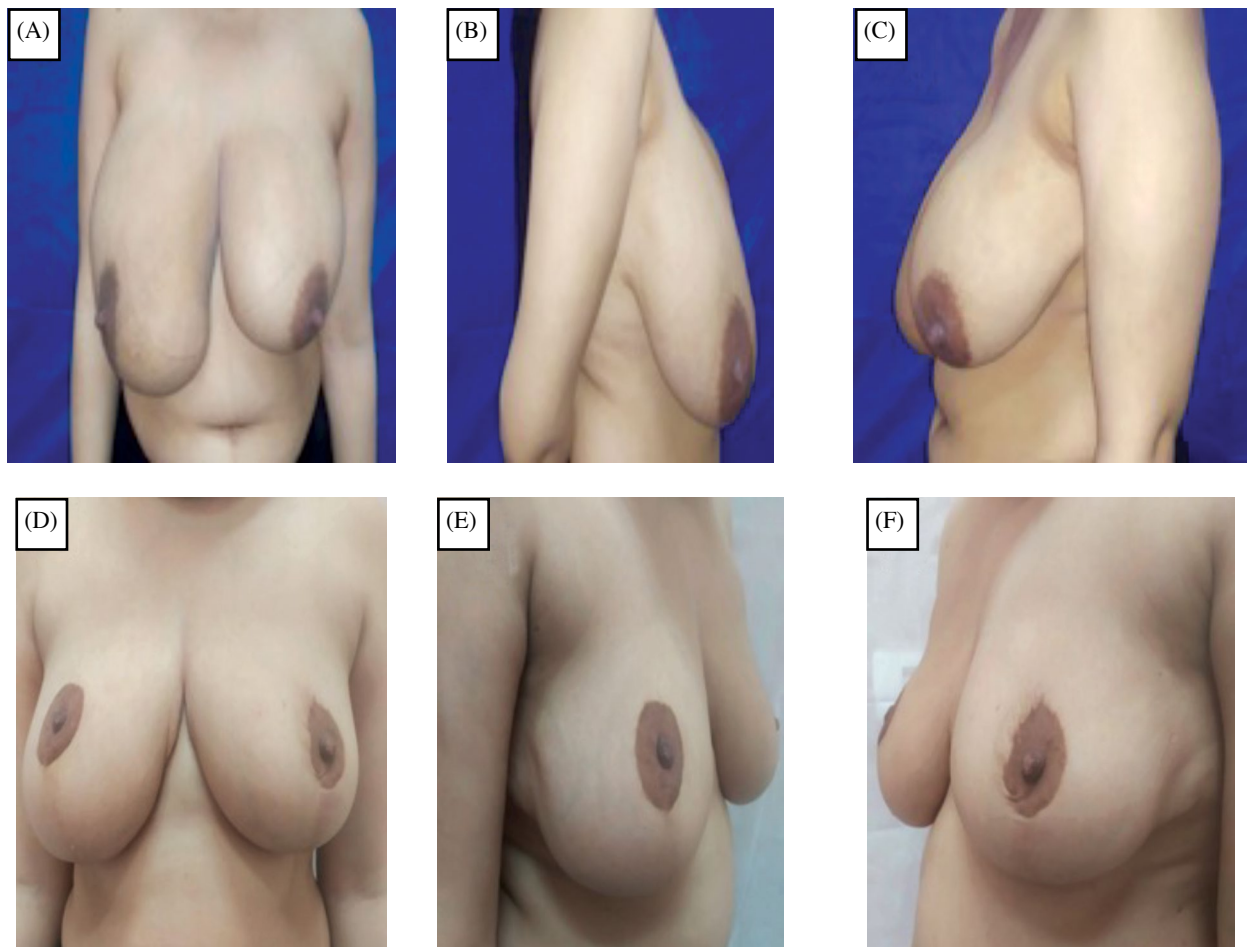
der of the NAC) was 8.1 vs. 8cm vs. 8.3cm at the one-month, six-month, and one-year follow-ups, respectively. The average measured NAC diameter was 4.6cm at the one-month and six-month follow-ups and 4.8cm at the one-year follow-up. The average measured pseudoptosis was 1.6 cm at the one-month and six-month follow-ups and almost remained stable at the one-year follow-up [1.7cm] (Fig. 6). There was a statistical difference between the preoperative breast measurement and the one-year postoperative measurement, as the p -value is 0.00764.

The mean score of postoperative body image satisfaction was 93.7% (range: 90%-97%). The post-operative mean score for psychological well-being was 94.8% (range 88%-98%). The post-operative mean score for sexual well-being was 89.3% (range 80-95%). The post-operative mean improvement of physical symptoms, including bra-strap groove and pain, was 95% in 95%

of the patients. The mean breast satisfaction score after the procedure was 96.3% (range 85%-100%) (Table 4).

The average volume of the tissue resected was 858g (range: 700-1050g). In this study, there was a low incidence of postoperative complications, but some complications were recorded. Only one patient (6.6%) had postoperative wound dehiscence at the T-junction, while another patient with long pedicles (6.6%) developed seroma. Two patients (13.3%) had postoperative breast asymmetry. Postoperative nipple areola complex (NAC) altered sensation was recorded in 2 (13.3%) patients; nevertheless, all of them improved within three months post-operatively. No patients developed postoperative hematomas, hypertrophic scars, keloid scars, bottoming out, or nipple retraction. There was no significant relationship between the presence of complications and having a high BMI or being older (Fig. 6).

Fig. (5): Example of preoperative and one-year post-operative photographs for a female patient who had bilateral reduction mammaplasty using a combined superomedial pedicle breast reduction with a "Hammock flap."



39-year-old female patient, married, with three previous breast feedings Suffering from bilateral breast hypertrophy with SN-N 36cm on the right side and 32 cm on the left side. [A, B, C] illustrate the preoperative photos [D, E, F] illustrate the one-year post-operative photos.

Table (1): Clinical and demographic characters distribution among studied group (n=15).

Variables	Minimum - Maximum	Mean ± SD
Age (years)	24-47	35.53±6.76
	No.	%
Smoking	0	0%
<i>Marital status:</i>		
Married	11	73.4%
Single	4	26.6%
<i>Number of children patient had breastfed:</i>		
Never breastfed	4	73.4%
Previous Breastfeeding	11	26.6%
<i>BMI:</i>		
≥25: kg/m ²	2	13.3%
≥30 kg/m ²	10	66.7%
≥35 kg/m ²	3	20%
Mean / SD		32.61±2.35 kg/m ² Minimum: 29 kg/m ² Maximum: 37 kg/m ²

Table (2): Patients pre and postoperative measurements (n=15).

Variable	Mean [cm]	± SD
- Pedicle length – pre (cm)	33.07	2.91
- Sternal notch-to-nipple distance, cm [pre]	31.3	1.63
- Infra-mammary fold to inferior border of NAC, cm [pre]	15.3	0.71
- NAC diameter, cm [pre]	7.2	0.80
- Ptosis, cm [pre]	8.6	0.35
- Sternal notch-to-nipple distance, cm [post 1 month]	22.3	1.58
- Infra-mammary fold to inferior border of NAC, cm [post 2 weeks]	8.1	0.29
- NAC diameter, cm [post 2 weeks]	4.6	0.36
- Pseudoptosis, cm [post 2 weeks]	1.6	0.38
- Sternal notch-to-nipple distance, cm [post 6 months]	22.3	1.58
- Infra-mammary fold to inferior border of NAC, cm [post 6 months]	8	0.38
- NAC diameter, cm [post 6 months]	4.6	0.33
- Pseudoptosis, cm [post 6 months]	1.6	0.38
- Sternal notch-to-nipple distance, cm [post 1 year]	23.3	1.03
- Infra-mammary fold to inferior border of NAC, cm [post 1 year]	8.3	0.45
- NAC diameter, cm [post 1 year]	4.8	0.33
- Pseudoptosis, cm [post 1 year]	1.7	0.41
<i>p-value between preoperative measurement and one year postoperative</i>	The value of <i>p</i> is 0.00764.	

Student *t*.test. the result is significant at *p*<.05.

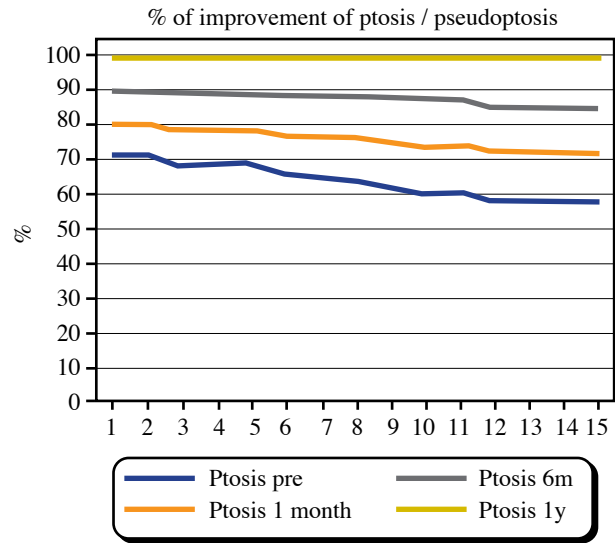


Fig. (6): % of improvement of ptosis / pseudoptosis (n=15).

Table (3): Pre-operative outcomes (n=15).

Variable	Minimum - Maximum	Mean ± SD
Body image satisfaction	30%-45%	37.13%±5.06
Psychological well-being	10%-39%	25.80%±8.07
Sexual well-being	20%-40%	29.8%±6.92
<i>Presence of physical symptoms:</i>		
Present	No.	%
Absent	14	93.3%
	1	6.7
Breast satisfaction score	15%-30%	20.9%±5.36

Table (4): Final post-operative outcomes after one year (n=15).

Variable	Minimum - Maximum	Mean ± SD
Body image satisfaction	90%-97%	93.7%±2.60
Psychological well-being	88%-98%	94.8%±3.02
Sexual well-being	80%-95%	89.3%±4.95
Improvement of physical symptoms	90%-100%	95%±3.21
Breast satisfaction score	85%-100%	96.3%±4.73
Satisfaction with outcome	87%-100%	95.3%±4.45

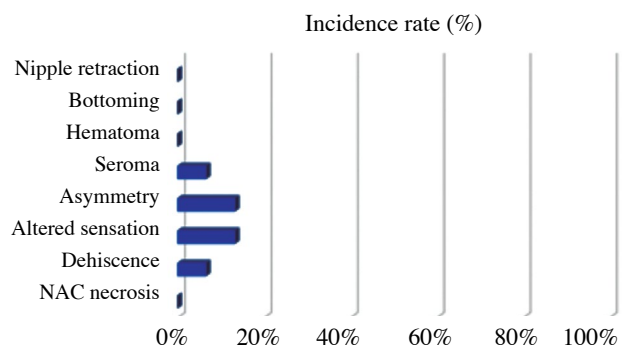


Fig. (7): Complications distribution among studied group (n=15).

Discussion

Reduction mammoplasty is becoming increasingly popular among people seeking aesthetic surgery. These women frequently presented with severe and chronic symptoms due to the presence of heavy breast tissue. Extensive preoperative preparation and individualised treatment are mandatory for an efficient operation with good aesthetic and functional outcomes [1,3].

Over the years, many approaches have appeared that can produce an excellent outcome. The different reduction mammoplasty techniques with different pedicles depend on the pedicle's blood supply, which also includes the nipple areola complex [9,10]. In large breasts, free nipple grafting is an option, but it is considered the last option due to the fact that the NAC cannot be maintained in its natural form in terms of colour, texture, and sensation [6].

The main concern of this study was assessment of the aesthetic outcome of the superomedial pedicle in wise-pattern reduction mammoplasty combined with the suspension "Hammock" flap approach. This technique was performed to prevent ptosis, maintain a long-lasting result, and relieve patient symptoms [11].

In this study, 15 female patients were operated on using the superomedial pedicle reduction mammoplasty combined with the suspension "Hammock" flap approach, which stabilised the pedicle over time. The tissue hammock was harvested through an internal mammary perforator dermo glandular flap rather than the pedicle; both the flap and the pedicle were separate but interconnected. The superomedial pedicle breast reduction, when paired with the hammock flap, allows for NAC and IMF repositioning as well as lower pole rearrangement [12]. The mean pedicle length in this study was 33.07 ± 2.91 cm. There was a direct correlation between the length of the pedicle and patients' satisfaction with the overall postoperative outcome. That finding was matched with the finding recorded by Roei et al. [13].

In this study, nearly all patients had physical symptoms that were almost completely relieved after the procedure, with a mean improvement of $95\% \pm 3.21$. In a study of 12 reduction mammoplasty patients with the superomedial pedicle technique, Fahmy et al. [14] found that 10 (83.3%) patients had physical symptoms like pain and bra-strap groove. All of them showed 100% improvement after breast reduction [14].

The mean percentage of preoperative body image satisfaction in this study was 37.1%, which improved to 93.7% one year post-operatively, with an overall satisfaction with the outcome of 95.3%.

Regarding the ordinary technique of superomedial breast reduction without hammock flap sling, Abd El-Latif et al. [15] found that the overall percentage of body image satisfaction was 66.7%. Furthermore, Kim et al., found that only 9 out of 18 patients had an increased satisfaction percentage at a 5-month follow-up period [16].

In this study, the average volume of the resected tissue was 858g. There was a direct correlation between relief of physical symptoms as well as the patient's satisfaction with the volume of tissue resected from each breast. In a study conducted by Roei et al. [13], the average volume of the resected tissue was 1150g. The difference is that the authors used the superomedial pedicle in huge breast hypertrophy, and their mean SSN-N distance was 35.0cm, whereas the mean SSN-N distance in this study was 31.3cm.

In this study, 1.6cm was the average measured pseudoptosis at the one-month and six-month follow-ups and almost remained stable at the one-year follow-up [1.7cm]. In a retrospective analysis, Sapino G et al., compared wise pattern breast reduction procedures (inferior pedicle vs. superomedial pedicle) over a 2-year follow-up and found that the average measured pseudoptosis at 2 years was 2.2cm for the superomedial pedicle breast reduction [17].

Regarding postoperative complications, in this study, there was a low incidence rate of postoperative complications, mainly breast asymmetry, altered sensation of NAC, postoperative wound dehiscence at the T-junction, and seroma. Both postoperative breast asymmetry and the altered sensation of NAC were improved within three months postoperatively. Abd El-Latif et al. [15] found that the incidence of postoperative complications was 25%, mainly seroma and wound dehiscence. Kim et al. [16] and Brownlee et al. reported the same findings [18]. Further large-scale studies are needed with a greater number of patients and ages above 50.

There was no significant relationship between the presence of complications and high BMI or increased age; similarly, in a retrospective study of 179 breast reductions, Roehl et al. concluded that reduction mammoplasty is a safe procedure regardless of the volume of the reduction or BMI, without any increase in the incidence of postoperative complications in obese or morbidly obese patients [13].

Conclusion:

The superomedial pedicle technique is a safe technique for reduction mammoplasty. This study clarifies that the sling technique of the hammock flap, which was performed through an internal mammary perforator autologous dermo glandular

flap, is an effective and safe procedure. The postoperative breast measurements were nearly constant at the one-year follow-up, as the mean SSN-N distance was 23.3cm, the mean lower pole length (IMF to inferior border of the NAC) was 8.3cm, and the mean NAC diameter was 4.8cm. After one year of follow-up, the mean score of postoperative body image satisfaction was 93.7%, psychological well-being was 94.8%, and sexual well-being was 89.3% (range 80-95%). The mean overall breast satisfaction score after one-year follow-up was 96.3%.

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