

Optimizing the Results of Superomedial Pedicle Reduction Mammoplasty

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ABSTRACT

Background: Reduction mammoplasty is commonly performed for females suffering from gigantomastia to relieve complaints such as pain of the breast, neck, and skin problems. Surgeons continuously aim to develop the best techniques for breast reduction through improving the results and decreasing complications. The superomedial pedicle technique combined with Wise-pattern skin resection has been frequently used as it provides several advantages such as the longevity of the results by avoiding bottoming out of the breast which occurs more with other techniques of breast reduction.

Patients and Methods: This study was performed to evaluate the use of superomedial breast reduction technique combined with two modifications (dermal transection and two dermal wings) to optimize the results of the superomedial technique. In this study, two modifications were used to optimize the results of superomedial pedicle, namely transection of the dermis at the base of the pedicle to facilitate the rotation of the pedicle and two dermal wings to act as an internal bra to suspend the remaining breast tissue after the reduction procedure.

Results: This study was performed on 30 patients complaining of breast hypertrophy in the period between 2019 and 2020. Complications were recorded as follows: Minor wound dehiscence (3 cases), minor nipple areolar complex necrosis (3 cases), and revision surgery (1 case). No patient reported nipple sensation problems. No bottoming out occurred in any of the cases.

Conclusion: This novel way of dermal flaps suspension combined with dermal transection at the pedicle base is a valuable tool for optimizing the results of superomedial reduction mammoplasty.

Key Words: *Reduction mammoplasty – Superomedial pedicle – Breast reduction – Dermal wings – Gigantomastia – Wise pattern.*

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INTRODUCTION

Reduction mammoplasty is commonly performed for females suffering from gigantomastia to relieve their complaints such as pain of the

breast, neck, shoulder, and skin problems which affect their lifestyle and to improve their breast appearance while minimizing the resultant scars. Surgeons continuously aim to develop the best techniques for breast reduction through improving the results and decreasing complications [1,2]. Wound complications especially scar size and bottoming out are the two most troublesome problems in breast reduction surgery [3]. Several modifications have been described recently to prevent these complications and to obtain the best aesthetic results [4]. In 1975, Orlando and Guthrie described the superomedial pedicle reduction mammoplasty which augmented the blood supply more than the previous superior pedicle [5].

The superomedial benefits from the perforator branches of the internal mammary artery thus ensuring adequate nipple vascularity. These perforators pass radially towards the nipple 1cm deep to the skin in the superficial subcutaneous tissues, which permits dermal transection to be done to facilitate pedicle rotation without affecting the nipple blood supply. The superomedial pedicle technique combined with Wise-pattern skin resection has been frequently used as it provides several advantages such as the longevity of the results by avoiding bottoming out of the breast which occurs more with other techniques of breast reduction [1,6]. This combination also can be applied safely to large reductions. The superomedial technique confers an advantage over the inferior pedicle technique by excising the inferior breast tissue and retaining the upper pole tissues which improves the pleasing upper breast fullness with minor revision rates [3]. Dermal suspension to the pectoral fascia is useful as a prophylaxis against bottoming out of the breast which is post-operative breast ptosis accompanied with superior nipple shifting [4]. The dermal suspension technique has been described in several different ways with both the

superomedial and inferior pedicles. Many other techniques were described to tackle this problem such as glandular shaping, pectoralis major muscle flaps, dermal strips, synthetic materials and suturing of the pedicle itself to the pectoral fascia [4,7]. In this study, two modifications were used to optimize the results of superomedial pedicle, namely transection of the dermis at the base of the pedicle to facilitate the rotation of the pedicle and a novel way of two dermal wings to act as an internal bra for suspension of the remaining breast tissue after the reduction procedure.

PATIENTS AND METHODS

Patients:

This study was registered and approved from the Medical Ethics Committee of the Faculty of Medicine, Alexandria University. Written informed consent was taken from all patients included in the study. This study was performed on 30 patients complaining of large sized breasts in the period between 2019 and 2020 by both authors in the Plastic Surgery department, Alexandria University hospital. The following data were recorded: Patients' age, weight of resected breast tissue, preoperative breast measurements [suprasternal notch to nipple distance and the distance between the nipple and the inframammary fold (N-IMF)], postoperative breast measurement (N-IMF immediately and one year postoperatively) and follow-up duration. The exclusion criteria were smokers and previous breast operations.

Methods:

The breast is a sensitive organ for preoperative examinations and marking. Similarly, reduction mammoplasty needs meticulous planning and analysis because there are many variable points like the supra-areolar point, length of the 2 vertical lines and the angle between the 2 vertical lines. So, applying a grid pattern to the patients' preoperative photos helps to provide a platform for good imaging and to judge these parameters as it allows accurate visual calculations (Fig. 1).

Markings in the standing posture:

Mark the midline from the sternal notch till the xiphisternum, then mark the midclavicular point (MCP). At the base of the breast mark a point at the same distance from the midline as MCP, then extend the MCL connecting the two points. Extend a line from the MCL running along the meridian of the breast. Along the last line mark a point at a range of 20 to 22cm from the sternal notch, according to the breast footprint and the patient's physique. This point will represent the upper edge of the

areola. A flexible ruler is used across the breast to confirm that this point coincides with Pitanguy's point (Fig. 2).

Along the breast meridian, mark a point at 8cm from the point of the future areola. Then mark 2 points at 6.5cm medial and lateral to the last point. Then draw lines connecting each of these points to the point of the future areola. Mark the inframammary fold (IMF) starting medially on the breast at a point 2cm lateral to the midline and ending laterally on the breast at a point on the anterior axillary line. Draw a line from each end of the IMF to the end of the corresponding limb. Mark the superomedial pedicle with its borders extending from the edges of the medial limb and the lower border curving just below the areola. Draw 2 wings, the medial wing originating at the upper third of the medial edge of the superomedial pedicle and extending inferomedially and the inferior wing starting from the tip of the superomedial pedicle with its base equal to the new proposed areolar diameter (5cm) and extending inferolaterally (Fig. 3).

General anesthesia was administered with preoperative antibiotic given at the time of induction. Prepping of the patient. Infiltration of the breast tissue and incision line was done by a tumescent solution containing 1ml adrenaline and normal saline. Torniquet was applied to the breast by a glove held by a Kocher forceps. Incisions of the pedicle were done and curving around the 2 wing extensions. De-epithelialization of the pedicle and the 2 the wings was done after marking by the cookie cutter and leaving the nipple and areola, followed by raising of the wings as dermal flaps without any fat (Fig. 4).

Removal of the torniquet and incisions were completed through the remaining lines with the scalpel beveled towards the parts to be excised. Using monopolar diathermy, cutting around the pedicle below the medial and lateral limb markings was done removing all the breast tissue till the IMF. Meticulous hemostasis was done. Dermal transection was performed at the base of the pedicle first by scalpel then by scissors to avoid excessive undermining and injury of the sub dermal plexus (Fig. 5).

Lateral and superior transposition of the pedicle was done supported by fixing the dermal wings to the pectoral fascia by 2 simple vicryl 2/0 sutures for each wing. The inferior dermal wing was fixed superiorly to the periosteum of the second or third ribs at the point which allows good positioning of

the pedicle. The medial wing was fixed laterally at the point which suspends the pedicle and at the same time avoids kinking of the pedicle. Then closure of the T junction was done by vicryl 0 suture followed by closure of the pillars in 2 layers deep fascial layer by vicryl 1/0 and subcutaneous layer by vicryl 2/0.

Insertion of suction drains and closure of the inframammary part also in 2 layers, followed by marking using the same cookie cutter around the upper part of the vertical pillars and then de-epithelialize the proposed areola. A cruciate incision is performed to deliver the areola through the deepithelialized part, followed by suturing the

subcutaneous part of the areola using vicryl 4/0. Then skin closure was done by intradermal sutures using monocryl 2/0 was used for the T shaped incision and monocryl 4/0 for the areolar part. Dressing was applied. Postoperatively drains were removed when their output was less than 30mls. The patients were followed for twelve months. Standard photos were taken preoperatively and postoperatively (on the first and second weeks then on the first, third, sixth and twelfth months) in the frontal, lateral and oblique views. Recording of any complications was done such as infection, hematoma, wound dehiscence, seroma, nipple necrosis whether total or partial, skin flap necrosis and revision surgery.

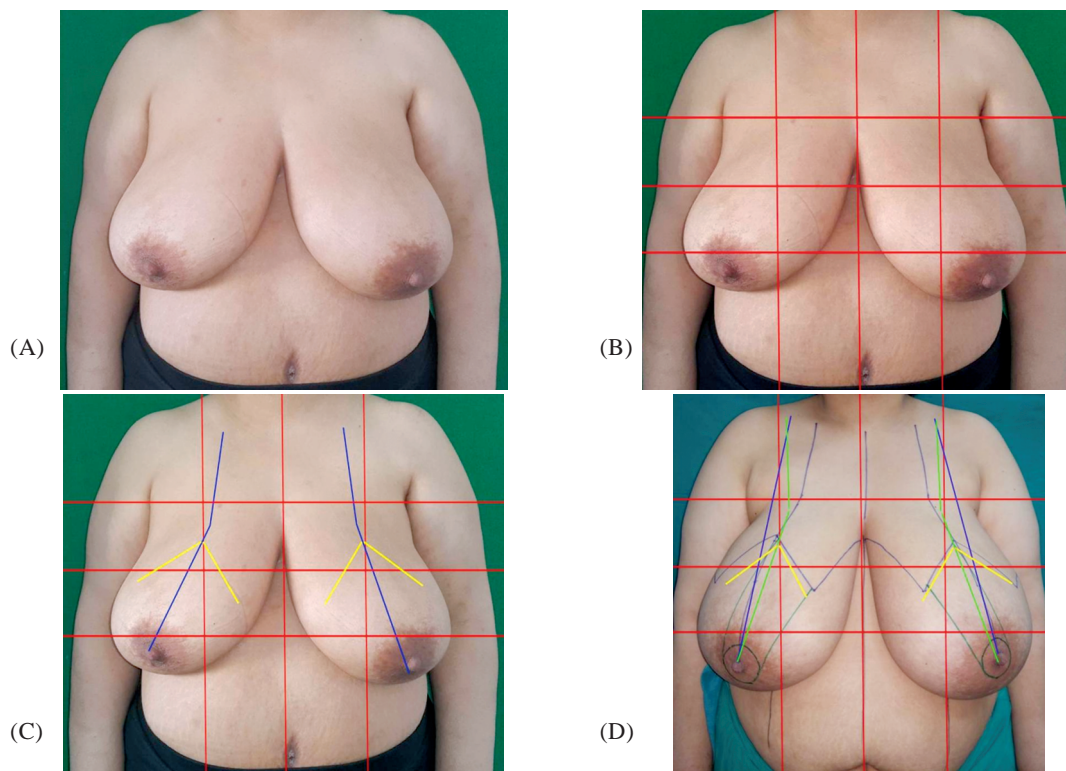


Fig. (1): Applying the grid pattern to the breast pre-operatively (A) Before applying the grid, (B) With applying the grid, (C) Applying the grid with the proposed breast markings, (D) Applying the grid with the actual breast markings.

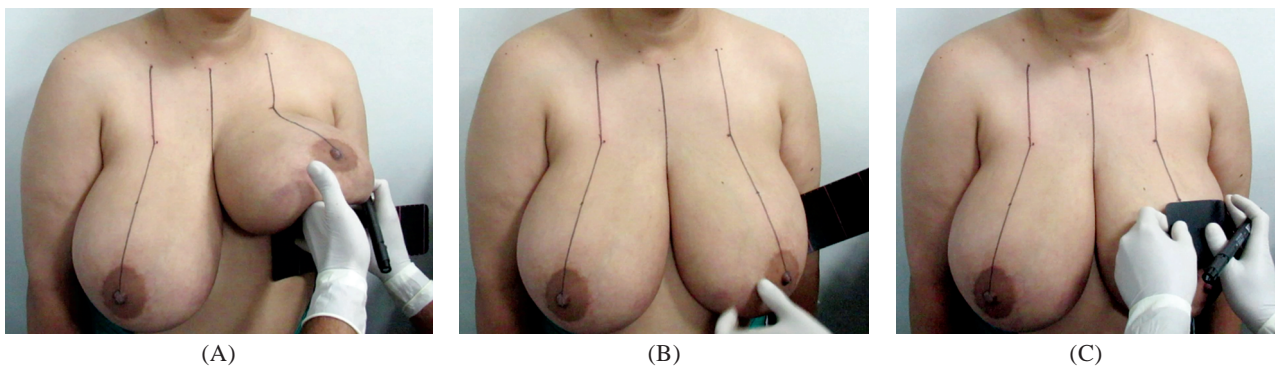


Fig. (2): Using a flexible ruler for confirming the position of the nipple (A) While elevating the breast to put the ruler, (B) After putting the ruler, (C) After bending the ruler to transpose the IMF.

Fig. (3): Pre-operative marking in the frontal view.

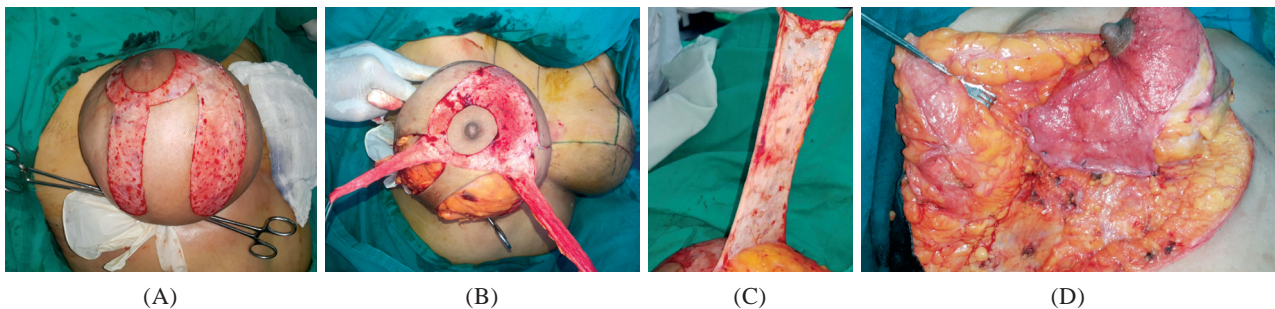
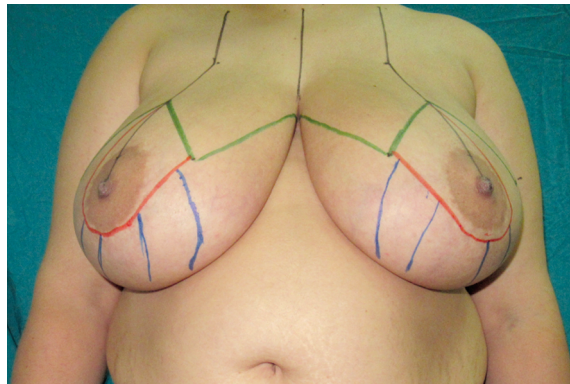


Fig. (4): Dermal flaps, (A) After de-epithelialization, (B) Raising of the flaps and (C) After raising the flap on its deep surface. (D) Showing anchoring of the dermal flap to the pectoral fascia.



Fig. (5): Dermal transection.

RESULTS

30 patients (60 breasts) were operated using the previously described technique. The mean patient age was 33 years (19 to 45 years), the mean weight of the resected breast tissue was 1500 grams per case (1000g to 2500g), mean follow-up period

was 18 months (3 to 22 months). The mean preoperative sternal notch to nipple distance was 40cm (32cm to 43cm). The mean pre-operative distance between the nipple and the inframammary fold (N-IMF) was 16cm (11cm to 19cm).

The mean immediate post-operative N-IMF was 7.1cm (6cm to 8.5cm), while the mean first year post-operative N-IMF was 7.6cm (6.5cm to 9cm) with an increase of 5mm than the immediate postoperative mean value. No bottoming out occurred in any of the cases.

Minor wound dehiscence occurred in 3 cases at the T junction and was treated conservatively by dressing in all cases. Similarly, minor nipple areolar complex necrosis (less than fourth of the areolar diameter) occurred in 3 cases and they all healed well by frequent dressings (Fig. 6). Revision surgery in the form of dog ear removal was required in 1 case. No patient reported any problem in nipple sensation.

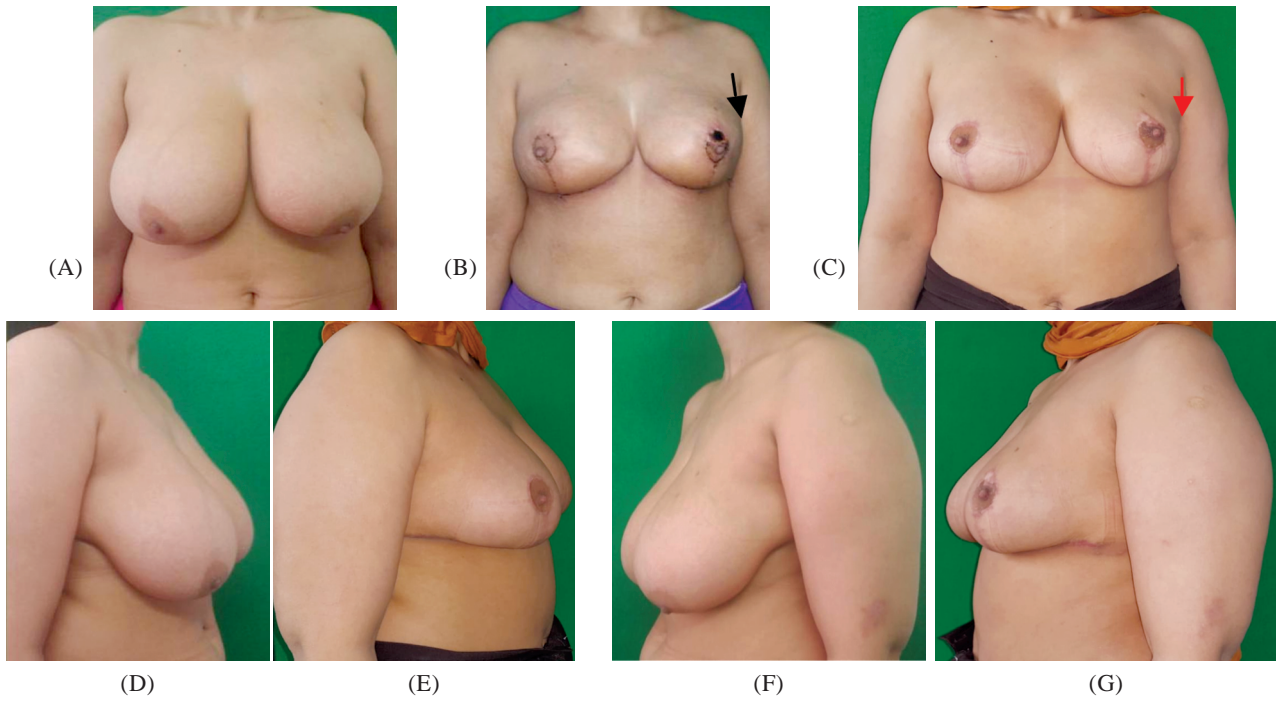


Fig. (6): (A) Frontal pre-operative view of a 26-year-old female with breast hypertrophy, (B) Frontal postoperative view showing partial necrosis of the upper part of the left areola pointed out by a black arrow, (C) Frontal post-operative view at 12 months after healing of the necrotic part of the areola by secondary intention pointed out by a red arrow, (D) Right lateral preoperative view, (E) Right lateral postoperative view, (F) Left lateral post-operative view, (G) Left lateral post-operative view.

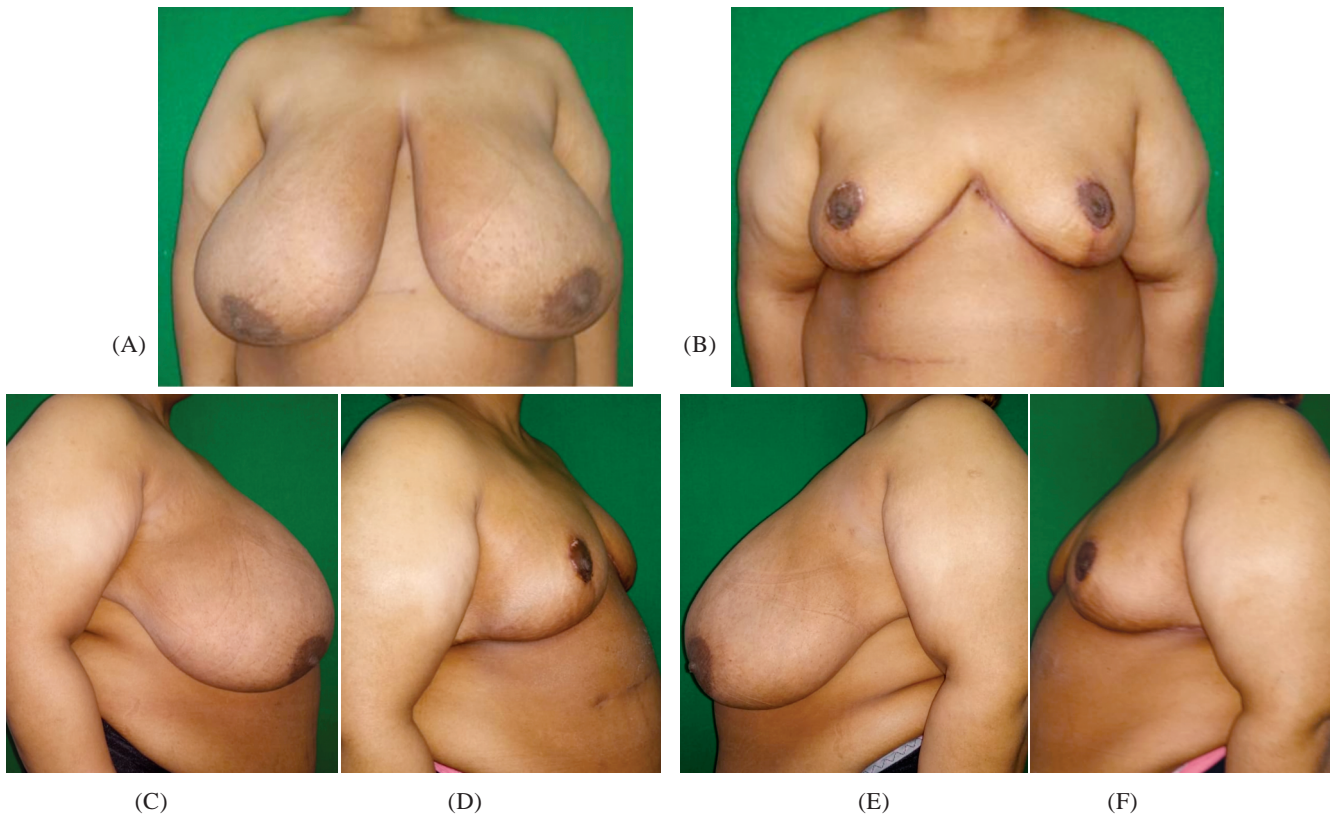


Fig. (7): (A) Frontal pre-operative view of a 35-year-old female with breast hypertrophy, (B) Frontal post-operative view at 12 months, (C) right lateral pre-operative view, (D) Right lateral post-operative view, (E) Left lateral pre-operative view, (F) Left lateral post-operative view.



Fig. (8): (A) Frontal pre-operative view of a 21-year-old female with breast hypertrophy, (B) Frontal postoperative view at 12 months, (C) Right lateral preoperative view, (D) Right lateral post-operative view, (E) Left lateral pre-operative view, (F) Left lateral post-operative view.

DISCUSSION

Reduction mammoplasty aims to relieve the patients' physical complaints while providing the best stable aesthetic result with the least possible scars and a viable sensate nipple areola complex. Many techniques and modifications of breast reduction are available and are still emerging. This proves that till now there is no ideal technique for reduction mammoplasty [8]. Also, despite there is a myriad of breast reduction techniques, still NAC necrosis is reported in the literature with both superiorly and inferiorly based flaps [9,10]. NAC necrosis is not frequent, but it is one of the most feared complications of reduction mammoplasty. It has a wide spectrum ranging from mild reversible nipple congestion to complete NAC necrosis. It is usually caused by venous congestion and less commonly by arterial insufficiency [11]. It can be managed conservatively by removing the periareolar sutures, applying nitroglycerine ointments, leeches (if accepted by the patient) or surgically by hematoma evacuation if detected and in severe cases by conversion to free nipple areola graft technique [11]. The free nipple graft technique can be done either intraoperatively or in the first six hours post-operatively. In cases of established

NAC necrosis dressings are used which either allows complete healing by secondary intention or may need surgical debridement and nipple reconstruction at a later stage [9]. In our study the cases which suffered from NAC necrosis healed spontaneously by using conventional frequent dressings.

The superomedial pedicle breast reduction has been recently performed more frequently by plastic surgeons who choose this technique based on its merits. The superomedial pedicle requires less operative time compared to the inferior pedicle and results in longer lasting results with lower incidence of bottoming out. It leads to better fullness of the upper breast pole which improves the aesthetic result of reduction mammoplasty [1]. Moreover, the superomedial pedicle technique helps to preserve nipple sensation by retaining the branches of the anterior intercostal nerves [12,13]. In the past, surgeons favored the inferior pedicle since it can be used safely in huge cases of gigantomastia to preserve nipple viability but was criticized for the common occurrence of bottoming out. Nowadays, the superomedial pedicle became popular to be used safely in huge cases also [14].

The Wise pattern technique is also favored by most plastic surgeons as it has a shorter learning

curve than vertical breast reduction, is easier to execute and can be applied to almost all breasts regardless of the size or shape or pedicle. Combining the superomedial pedicle with wise pattern technique has been shown to improve the results of both techniques while decreasing the disadvantages of each of them. Among the commonest disadvantages of the wise pattern is post-operative increase in the nipple to inframammary fold distance resulting in bottoming out due to the effect of gravity on the breast tissues [15].

The superomedial pedicle inherently decreases the incidence of postoperative breast bottoming out [16]. The idea of pedicle suspension has been developed using several techniques such as dermal flaps, pectoralis major flaps and foreign materials [17]. The dermal flaps are elevated from the tissues which are usually discarded during breast reduction surgery which is considered as one of their advantages instead of using foreign materials or autologous tissue from other sites of the body with their accompanying donor site morbidity [14,18]. The introduction of foreign material such as artificial mesh or acellular dermal matrix has been described for breast suspension but accompanied with the disadvantages of fibrosis, infection, and obscuring the breast imaging for cancer detection [19].

The dermal flaps ensure reliable suspension of the pedicle to the pectoral fascia [20]. The only disadvantage of this technique is the increased operative time by about 15 to 20 minutes needed to de-epithelialize, raise, and suspend the dermal wings [4,21]. Several techniques and modifications of the dermal flaps have been described in the literature depending on their shape, origin and site of suspension [3,7,17,22]. The dermal suspension of the pedicle to the chest wall provides both an early advantage by decreasing wound dehiscence problems due to decreased tension and a late advantage by preventing bottoming out [21]. In this study, a novel way of dermal flaps is described in the form of two dermal wings one starting from the medial edge of the superomedial pedicle and extending inferomedially and the other one starting from the tip of the superomedial pedicle and extending inferolaterally. Both wings were fixed to the pectoral fascia. The inferior dermal wing was fixed superiorly, and the medial wing was fixed laterally at the point which suspends the pedicle and at the same time avoids kinking of the pedicle.

The bottoming out is defined as an increase of more than 2cm of the distance between the nipple and inframammary fold [7,23]. In our study, the immediate postoperative nipple-to-inframammary

fold distance was compared with the same distance during the follow-up visit after one year to assess the occurrence of bottoming out. This revealed an increase of only 5mm one year after the operation and thus none of our cases were defined to have bottoming out.

The complication rate in our series was 23.3% (n=7) of the patients (11.6% of the operated breasts) which is within the ranges of complications of reduction mammoplasty reported in the literature (5 to 53%) [6,24-27]. No patient had more than one of the reported complications in this series. All the complications were managed conservatively (3 minor wound dehiscence and 3 minor nipple necrosis) except for one patient who had an elective surgery for a lateral dog ear removal at the sixth post operative month.

Regarding the blood supply of the superomedial pedicle, the internal mammary artery gives a branch emerging from the second or third intercostal space and then runs along the breast meridian towards the nipple deep to the skin by 1cm. This allows the technique of dermal transection by performing a superficial dermal incision at the base of the pedicle to ease the rotation of the pedicle without compromising nipple vascularity [16,17,28].

The limitation of this study is that it needs to be applied on a higher number of cases which need to be followed-up for a longer interval.

Conclusion:

The dermal wings provide pedicle suspension without the risk of adding foreign materials into the breast and the dermal transection helps to ease pedicle rotation. This novel way of dermal flaps suspension combined with dermal transection at the pedicle base is a valuable tool for optimizing the results of superomedial reduction mammoplasty.

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