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Comparison of Nipple–Areola Complex Complications after Superomedial Pedicle versus Inferior Pedicle Techniques in Reduction Mammoplasty

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Abstract:

Introduction: Reduction mammoplasty is a common surgical procedure for macromastia, with various techniques available to ensure optimal aesthetic and functional outcomes. Reduction mammoplasty using a superomedial pedicle and vertical scar is being practiced more and more frequently, as compared with inferior pedicle techniques using a Wise pattern skin incision. Still, there are surgeons who are practicing the IFP technique for all of their reduction mammoplasties. There is no study in our country that compares NAC complications in the two types of breast reduction. The purpose of this study is to compare the NAC complications after SMP and IFP breast reduction techniques. ***Objective:*** This study aims to compare NAC complications following the use of the superomedial pedicle and inferior pedicle techniques in 100 consecutive cases. ***Methods:*** A retrospective analysis was conducted on 100 patients (200 breasts) who underwent reduction mammoplasty over a period of 12 years, with 58 cases performed using the superomedial pedicle technique and 42 using the inferior pedicle technique. Postoperative NAC complications, including partial or total necrosis, and sensory impairment, were assessed over a minimum follow-up period of six months. ***Results:*** SMP generally demonstrates lower rates of NAC venous congestion and partial necrosis compared to IP, especially in large-volume reductions, due to its shorter pedicle length and robust vascular supply from internal mammary perforators. IP, however, offers reliable perfusion for moderate reductions but shows higher rates of sensory loss and NAC bottoming out over time. In our study, partial NAC loss occurred in 11.90% of the inferior pedicle cases versus 1.72% in the superomedial pedicle cases. Total NAC loss was observed in 2.38% of inferior pedicle cases and 0% of superomedial pedicle cases. Sensory loss was also more frequent in the inferior pedicle group (21%) than in the superomedial pedicle group (5%). ***Conclusion:*** The superomedial pedicle technique appears to be associated with a lower rate of NAC complications compared to the inferior pedicle technique. Given the reduced risk of NAC necrosis and sensory impairment in the superomedial pedicle approach, this technique appears to be a preferable option for reduction mammoplasty surgeries.

Keywords: Superomedial pedicle, Inferior Pedicle, Nipple areolar complex.

INTRODUCTION

Reduction mammoplasty is a common reconstructive and aesthetic breast procedure performed for macromastia, aiming to improve physical symptoms, posture, and quality of life. The choice of pedicle is a critical surgical decision that affects not only breast shape and longevity of results but also NAC viability and function. The primary goals of reduction mammoplasty is to decrease the breast volume along with preservation of the nipple-areolar complex(NAC).This has been consistently achieved through various combinations of pedicles and skin excision patterns[1,2].However, it is the ability to accomplish these primary aims while increasing attention to aesthetic result, maintenance of NAC sensation, and

minimizing scarring that has driven the evolution of reduction mammoplasty techniques and the comparison regarding the ideal technique[1].

Reduction mammoplasty is a well-established surgical procedure for the management of macromastia, aiming to alleviate physical symptoms, improve posture, and enhance quality of life. Numerous pedicle designs have been developed to maintain reliable nipple–areola complex (NAC) vascularity, preserve sensation, and achieve a favorable breast shape. Among these, the inferior pedicle and superomedial pedicle techniques are two of the most commonly employed worldwide.

The inferior pedicle technique, often combined with inverted T excision, offers good vascularity from the fourth to sixth intercostal perforators and is versatile for large volume reductions[3].However, its critics recognize some aesthetic drawbacks to the technique, including a hypertrophic scar along the inframammary fold, squaring of the breast contours, and a tendency to produce pseudoptosis over time[2,4,5].

The superomedial pedicle technique**,** frequently incorporated into vertical or short-scar patterns, utilizes the internal mammary perforator system and maintains upper pole fullness with a more centralized breast mound. This method may offer a shorter scar with decreased scar hypertrophy,as well as the benefits of retained upper pole fullness and more extensive lateral parenchymal reduction,producing a desirable surgical result with greater projection3,5. While the SMP/VS technique has proven effective for small- and medium-volume reductions.

Some surgeons have expressed hesitancy in applying SMP/VS techniques for large-volume reduction mammaplasties, citing increased complication rates with higher resection volumes[6-8]. Furthermore, despite several studies indicating the reliability of SMP reductions in gigantomastia[1,2,5,6], concern over compromise of blood supply to the NAC during pedicle rotation has prompted some surgeons to limit application of the vertical reduction with superomedial pedicle to breast reductions less than 1000g[1,7].

Both pedicle types have demonstrated high patient satisfaction and reliable outcomes, yet comparative data on NAC-related complications, including partial or full necrosis, venous congestion, wound dehiscence, asymmetry, and sensory changes remain variable across studies[1,4]. Selection often depends on patient anatomy, resection weight, degree of ptosis, and surgeon preference. This study aims to compare NAC outcomes between the superomedial and inferior pedicle techniques to guide evidence-based pedicle selection in reduction mammoplasty.

PATIENTS AND METHODS:

This study was conducted in CSCL and BSH Dhaka, and the period of study was January 2016 to December 2024.Data on these patients were collected retrospectively, and patient demographics, preoperative measurements, resection weight, and follow-up visits were recorded. For this study, patients who have macromastia are included in this study. Patients who have breast cancer are excluded from our studies. A total of 100 patients who underwent reduction mammoplasty were included.42 patients (that is, 84 procedures) were done by the inferior pedicle technique. And 58 patients (that is, 116 procedures) were done by the superomedial pedicle technique (Figure 1). Comparison of NAC complications was done to show the difference between the two techniques.

Surgical Techniques

Superomedial Pedicle with (mostly with Vertical Scar reduction)

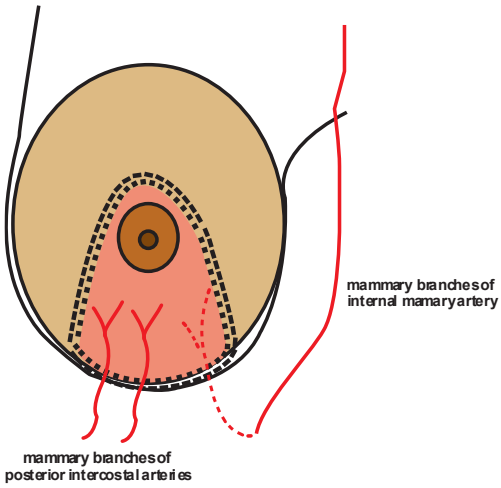
Preoperative markings for a superomedial dermo glandular pedicle with vertical skin reduction technique are applied in the surgical holding area. (Figure 1a.) Skin quality (elasticity and stretch marks) and volume of reduction are assessed to determine the new nipple position, typically at the inframammary fold or 1–2 cm below. The skin resection is drawn in a dome-mosque configuration with the vertical limbs marked with displacement of the breast medially and laterally along the breast meridian. The lower extent of the vertical limbs is typically 3–6 cm above the IMF, 12 depending on the size of reduction. (Figure 1b.)

In the operating room, the nipple-areolar complex diameters are measured at 38–42mm, and a superomedial pedicle of 6–10 cm is de-epithelialized while leaving an intact NAC. (Figure1c.) Dermo-glandular resections proceed next, beginning with the inferior portion of the breast, with direct defatting of the inframammary fold in the mastectomy plane. (Figure 1d.) Dissection continues laterally to form the lateral pillar. The lateral pillar is approximated at2cm–3cm thickness as it approaches the chest wall, taking care to preserve the pectoral fascia and neurovascular structures. C-shaped resection of the medial, inferior, lateral, and superior aspects of the breast allows for adequate reduction, coning of the breast, and rotational freedom of the superomedial pedicle. (Figure 1e.) Care is maintained to ensure that no undue tension or kinking is placed upon the pedicle. Following additional breast contouring to achieve proper symmetry and extent of reduction, the NAC is temporarily stapled into position. 2-0 PDS sutures are used to join lateral and medial pillars, both in deep and

superficial depths, to adequately cone the breast. A drain is placed prior to skin closure. The NAC is inset with 4-0 vicryl deep dermal and 4-0 running subcuticular Monocryl sutures. 3-0 sutures are utilized along the vertical limb with mild cinching along the inferior limb and anchoring to the chest wall, keeping the vertical incision within the confines of the inferior pole of the breast. (Figure 1f.) (The authors recognize that a small T or L scar (<5cm) can be used in lieu of cinching, though not routinely used in our practice or in this cohort.)

Inferior Pedicle (with Inverted-T/Wise Pattern reduction)

Preoperative markings for an inferior pedicle with Wise pattern skin excision are applied in the surgical holding area. With the patient standing, breast meridians are marked bilaterally along with the new nipple location and proposed inframammary folds. In the operating room, nipple diameter markings are made at 38–42mm, and an inferior pedicle is designed. The inferior pedicle and new nipple location are de-epithelialized, while taking care to leave the NAC intact. The inferior pedicle is developed by incising to the depth of the chest wall. Resection proceeds according to preoperative markings, with additional "fanning-out" of the pedicle base inferiorly to maximize blood supply. Dermatoglandular wedge resection of medial, superior, and lateral sections is performed to reduce breast volume, with careful attention to medial resection to maintain proper medial contours. Skin flaps are trimmed to1.5cm thickness, and a superior pocket is created for placement of the NAC. Temporary staples are placed along the vertical limb of the incision, and the patient is evaluated for symmetry and adequacy of resection with temporary closure in the seated position. Additional reduction and contouring is accomplished as needed, and drains are placed bilaterally. Nipple-areolar complexes are sutured to their new positions with 4-0 interrupted non-resorbable suture prior to closure of the inverted-T incision.



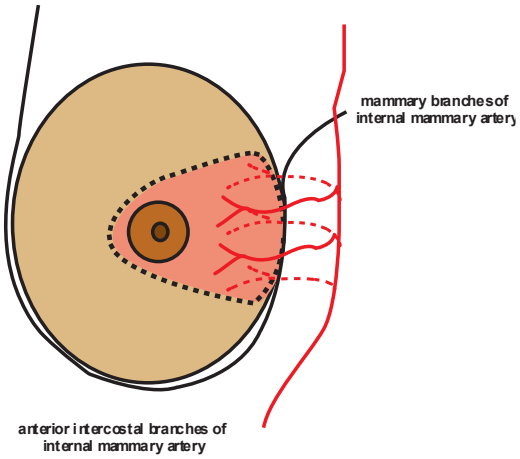
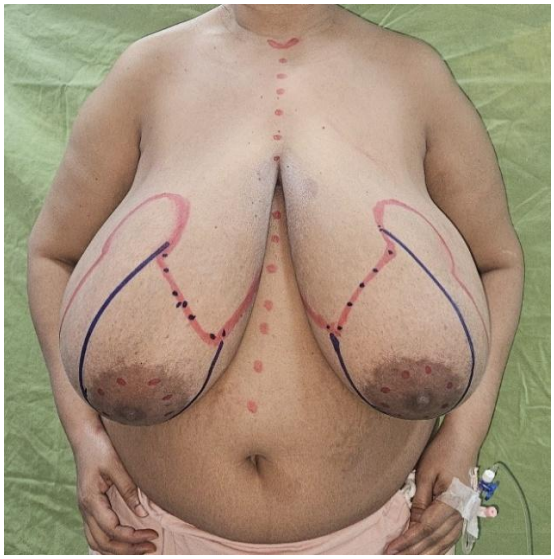


Figure 1: Blood supply for inferior pedicle Figure 2: Blood supply for superomedial pedicle



a

b

c

Figure 3 (a, b, c): Preoperative markings for reduction mammoplasty using superomedial pedicle techniques and Wise pattern skin resection.

Figure 4: Superomedial pedicles dissected out on both sides.

Figure 5: NAC necrosis following inferior pedicle reduction mammoplasty

RESULTS:

200 bilateral breast reductions (BR) were performed in 100 patients between 2016 and 2024.Superomedial pedicle technique was used in 58 patients, whereas the inferior pedicle technique was used in 42 patients. Inferior pedicle was mostly combined with Wise pattern skin incision; and superomedial pedicle technique was almost always combined with Vertical pattern skin incision, unless the breasts were very big and ptotic. SMP technique provided lower rates of NAC venous congestion and partial necrosis compared to IP technique, especially in large-volume reductions, due to its shorter pedicle length and robust vascular supply from internal mammary perforators. IP, however, offers reliable perfusion for moderate reductions but shows higher rates of NAC bottoming out and sensory loss over time. Partial NAC loss occurred in 11.90% of the inferior pedicle cases versus 1.72% in the superomedial pedicle cases. Total NAC loss was observed in 1

case (2.38%) of inferior pedicle group and nil in superomedial pedicle group. Sensory loss was also more frequent in the inferior pedicle group (21%) than in the superomedial pedicle group (5%). In both cases, asymmetry of NAC was seen in 5 cases in inferior Pedicle group whereas only one was found in superomedial group. Excess scarring was seen in 9 cases in inferior pedicle group whereas 2 noted superomedial group 5.95% Wound dehiscence was seen in the inferior pedicle and 2% in the case of the Superior medial pedicle. Mean volume of tissue reduced was 415 grams per breast (range 200–1600g). All patients achieved symptomatic relief.

Table 1: Total number of patients undergoing Reduction Mammoplasty

Superomedial Pedicle	Inferior Pedicle	Total
58	42	100

Table 2: Complications of Superomedial Pedicle (SMP)and Inferior Pedicle (IFP)

Variables	Superomedial Pedicle	Inferior Pedicle
NAC necrosis		
A) Partial	1	4
B) Full	0	1
NAC sensation		
A) Partial	2	11
B) Full	4	12
Wound dehiscence	2	8
Asymmetry	1	5
Scar	2	9

DISCUSSION:

Reduction mammoplasty remains a cornerstone procedure in plastic and reconstructive surgery, aiming to alleviate symptoms associated with macromastia while maintaining breast function and aesthetics. Among the various pedicle techniques, the superomedial and inferior pedicle methods are two of the most widely used, each with unique anatomical considerations, indications, and outcomes.

The inferior pedicle technique utilizes tissue based on the inferior (lower) pole of the breast, preserving the 4th–6th intercostal perforators, providing vascularity to the nipple-areola complex (NAC), making it a commonly used method in patients with significant ptosis and large reductions[3].

In contrast, the superior medial pedicle preserves a dermo glandular flap oriented toward the superomedial quadrant, based primarily on the 2nd–4th inter costal perforators, particularly branches of the internal mammary artery[2]. This pedicle has gained popularity due to its reliable blood supply, ease of NAC repositioning, and improved breast projection.

The superomedial pedicle offers advantages in upper pole fullness and natural breast contouring. It is particularly favorable in younger patients or those desiring a rounder, more projected breast mound[1,2].

The inferior pedicle, while reliable, is often criticized for resulting in bottoming out over time, because of gravity on the weight of the inferior-based tissue. Patients may experience ptotic recurrence or inferior displacement of the NAC in long-term follow-up[5].

Regarding NAC sensation, NAC sensation is better in SMP than IFP[9]. Another study shows NAC sensation better in SMP and also scar hypertrophy is less in SMP[10]. NAC sensation complication is more in IFP than SMP[11].

In very large resections (>1 kg per breast), however, the inferior pedicle may provide safer outcomes due to its robust vascularity, reducing the risk of NAC necrosis. In recent study it shows there is no difference between SMP and IFP but for large volume resection SMP is a safe alternative[12].

The superomedial technique, while adaptable, may be limited in very large reductions due to potential vascular compromise over long pedicle lengths.

Both techniques can be performed with Wise pattern (inverted-T) or vertical (lollipop) skin excisions, but the superior medial pedicle is often favored in short-scar techniques due to better NAC mobility and shape control[13]. Inferior pedicle techniques often require the Wise pattern due to the bulk and positioning of the tissue[14].

The inferior pedicle has a well-documented complication profile, including wound dehiscence, bottoming out, and long-term ptosis. IFP also shows 4.3 times more complication rates than SMP[15].The superior medial pedicle shows lower revision rates, particularly for aesthetic concerns[6]. Aesthetic result is better in SMP [16]and the operative time is less in SMP[15].

Some of the study shows no differences between SMP and IFP[17-19]. In recent review paper where 12 observational comparative studies were included. It shows the superomedial pedicle technique had a significantly lower rate of overall complications and delayed wound healing than the inferior pedicle technique[20].

However, the surgeon's experience and preference remain an important factor in deciding which type of pedicle is chosen for any particular patient.

CONCLUSION:

The superomedial pedicle technique appears to be associated with a lower rate of NAC complications compared to the inferior pedicle technique. Given the reduced risk of avascular necrosis and sensory impairment, the superomedial pedicle approach appears to be a better option for reduction mammoplasty surgeries.

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