

# The Vertical Scar Reduction Mammoplasty: a Review of 50 Cases Using Hall Findlay's Technique

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## ABSTRACT

**Objectives:** To present our experience in treating mammary hypertrophy using the vertical scar reduction mammoplasty with a superomedial pedicle (the Hall Findlay's Technique).

**Methods:** A total of 120 patients were treated at the Royal Rehabilitation Center for mammary hypertrophy during the period between January 2004 and November 2010, 50(41.7%) of these patients were treated using the vertical scar reduction technique. Their medical records were reviewed regarding age, risk factors, reduction size, patient's satisfaction and complications. All patients were followed for a mean period of 3 years.

**Result:** The mean age of the patients was 37 years, six patients were smokers, two patients had a controlled hypertension, and none had diabetes mellitus. The mean amount of tissue removed per breast was 650g for the right breast and 710g for the left breast (with a range of 250g to 2400g) from each side, the procedure resulted in abatement of preoperative symptoms with a good overall patient satisfaction. Three patients (6%) had wound dehiscence, 5 patients (10%) had partial areolar sloughing, with no loss to the nipple areolar complex either partially or completely. Three patients (6 %) had minor asymmetry.

**Conclusion:** This technique for vertical scar reduction mammoplasty has been applied to breast reductions of all sizes and has consistently produced a good breast shape and projection, leaving less scarring than standard breast reductions. The technique needs good preoperative planning but it is a straightforward procedure and easy to learn, it offers a safe, effective, and predictable way for treating mammary hypertrophy

**Key Words:** Mammoplasty, Nipple areola complex, Superomedial, Vertical scar.

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## Introduction

Breast reduction can be defined as a surgical reduction of the breast volume to achieve a smaller, aesthetically shaped breast mound with concomitant relief of the potential symptoms of mammary hypertrophy.<sup>(1)</sup> Many options are available to the surgeon for breast reduction, no single technique should be applied to all breasts. It is critically important to realize that in breast reduction surgery, the pedicle and the skin excision pattern can be independent variables, so any pedicle can be used

with any skin resection pattern.<sup>(2)</sup> The most two popular skin patterns are the wise "inverted-T" and "vertical" patterns which can be combined with several different nipple pedicles. But the "inverted-T" tends to be associated with an inferior or central pedicle whereas the "vertical" pattern is often associated with superior or superomedial pedicle.<sup>(1,2)</sup> A recent survey found that the inferior pedicle, inverted-T skin pattern is still the most common breast reduction technique used among U.S. plastic surgeons.<sup>(3,4)</sup> Lately surgeons started minimizing the

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overall scars in breast reduction making the vertical scar the best option for all patients with mammary hypertrophy.<sup>(5)</sup> Although the vertical scar reduction has not achieved a widespread acceptance, since many plastic surgeons still view it as a technique with certain limitations and a high learning curve. This study was conducted to describe our experience in this technique.

## Methods

A total of 120 patients were treated at the royal rehabilitation center for mammary hypertrophy during the period between January 2004 and November 2010, 50 (41.7%) of these patients were treated using the vertical scar superomedial pedicle reduction technique described by Elizabeth Hall-Findlay. Their medical records were reviewed regarding age, risk factors, reduction size, patient's satisfaction and complications. All patients were followed for a mean period of 3 years. The mean ages for the patients were 37 (range: 22-57 years). Six patients were smoker, two patients had a controlled hypertension, and none had diabetes mellitus. The mean amount of tissue removed per breast was 650g for the right breast and 710g for the left breast (with a range of 250g to 2400g) from each side. Patients were examined and consulted in the clinic. Preoperative evaluation also included a review of operative risk factors, breast examination and mammography. Patients were admitted one day prior to surgery and one unit of packed RBCs were prepared for each patient as our local protocol. Marking was done in a modified manner in both standing and supine positions. All procedures were carried out under general anesthesia; all patients received cephazoline 1g as prophylactic antibiotic. Suction drains were used routinely, removed within 1-3 days depending on the drainage. Patients were followed in a week, 3 weeks, 3 months and one year intervals. All patients were advised to wear a sports brassiere for 3 months.

## Technique

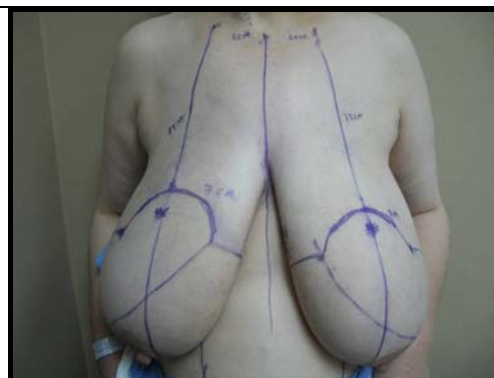
The surgical procedure begins by preoperative marking of the patients, which is done while the patient is in the standing position first, in which the midline is marked then the central axis of the breast (the meridian) is drawn by extending a straight line from the midpoint of the clavicle through the nipple to intersect with the inframammary crease to the upper abdomen. The next most important step is to determine the new nipple position which is

determined by the inframammary fold, in a distance from the sternal notch averaged 20-22cm, by inserting the doctor's hand behind the breast at the level of the inframammary fold in which project anteriorly onto the breast. The areola opening is marked using a freehand design that result in a mosque dome shape 2cm above the new nipple position, to establish an areolar diameter between 4-5cm,<sup>(6,7)</sup> then marking is continued in a supine position, where the breast is rotated medially and laterally to mark the medial and lateral limbs respectively. If small reduction is desired then these limbs are drawn less wide from each other. Both these lines are joined inferiorly in a rounded fashion just about 2-4 cm above the inframammary fold.<sup>(8)</sup> The superomedial pedicle is designed with an 8 cm base, which is often extended into the new areolar site to some degree. If difficulty is anticipated in rotating the pedicle, its base is planed entirely on the upper portion of the medial vertical limb, a rim of 1-2cm is lift around the areola for safety.<sup>(9)</sup> Figure 1 shows preoperative marking.

The surgery is conducted under general anesthesia; the patient is sit in a supine position with the upper limbs abducted. A tourniquet is applied to the base of the breast to keep the skin overlying the breast taut. The nipple-areola complex is outlined using a metallic areolar marker, it may vary from 42-46 mm in diameter depending on the breast size, centered over the nipple.<sup>(10)</sup> The nipple-areola complex and the pedicle are marked then deepithelialization of the skin is carried out using a no. 15 blade, the pedicle is incised vertically down toward the chest wall without undermining to keep the full thickness of the pedicle using the cutting cautery.<sup>(11)</sup> Then a surgical excision is done en bloc for the skin, fat, and gland in a C-shape fashion down to the chest wall, leaving some tissue over the pectoralis fascia. We resect more tissue inferiorly and laterally with a small amount superiorly and medially, by this, we leave some breast tissue superiorly for the nipple-areola complex to sit on for better upper pole fullness of the breast. We perform a direct lipectomy at the inferior pole down to the inframammary fold and to the excess breast tissue laterally, which decreases post-operative tissue bulging laterally and decreases the incidence of dog ear inferiorly. Homeostasis is secured and the lower end of the areola is approximated by staplers then rotation of the pedicle to its new position is done. Three permanent anchoring stitches is used to bring the medial and lateral pillars together which

**Table I.** Postoperative complications

Complication		
Type		No. of patients
Early	Wound dehiscence	3 (6%)
	Partial areola sloughing	5 (10%)
Late	Minor asymmetry	3(6%)



**Fig. 1.** Shows preoperative marking



**Fig. 2.** Shows pre and post operative results



**Fig. 3.** Shows pre and post operative results

tailors the breast shape. If asymmetry is encountered at this stage further resection is advised, a suction drain is exteriorized by a far stab wound at the lateral chest wall. The skin is closed by buried 3-0 vicryl sutures; the breast tissue inferiorly is pliable to be gathered, where rarely a wound extension is needed laterally as an “L” wound.<sup>(12)</sup> A gauze dressing is applied over the incisions. All excised breast tissues were sent for histopathological study.<sup>(13)</sup> The patient is admitted to the hospital for maximum of three days, drains are removed in 1-3 days post operatively. Figure 2 and 3 shows pre and post operative results.

## Results

All our patients had an uneventful postoperative period with a recovery time of 3 weeks; the same

technique was used to all breast reductions. The average amount of tissue removed per breast was 650g for the right breast and 710g for the left breast (with a range of 250g to 2400g). No hematoma, seroma, or infection- related complications were encountered. Complications were divided into: early and late complication. The first group occurred within 3 weeks of the procedure in which 3 patients (6%) had a wound dehiscence in the upper part of the vertical scar, two of them underwent delayed primary closure and one was treated conservatively where it healed within 4 weeks. No patients had total or partial nipple-areola complex loss; nevertheless 5 patients (10%) had partial areolar sloughing, all of which healed satisfactory with simple dressing alone. Late complications occurred in 3 (6%) patients were minor asymmetry

encountered either in the breast or nipple size, which was not of a major concern to the patients. None of the patients complained of dog ears since they were all dealt with intraoperatively either by gathering them up or extending the vertical scar laterally in an "L" shape fashion where 7 (14%) patients had this scar. Most of these complications occurred in large reductions. The mean hospital stay was 3 days (ranging from 1-4 days). The follow up period was one year for all patients. A specially designed simple questionnaire was used to obtain patient's satisfaction, in which 48 (96%) patients were satisfied with the procedure; reliving their symptoms and improving their self esteem. All our patients had a new baseline mammography after 3-6 months following surgery. Table I shows postoperative complications.

## Discussion

Reduction mammoplasty was developed to alleviate the physical and psychosocial discomfort associated with macromastia. It was described as early as the 16<sup>th</sup> century AD. Schaller described the breast amputation mammoplasty in the 19th century. Biesenberge was the first to develop the parenchymal pedicle-based technique with an inverted T scar and a "cut as you go" pattern to achieve skin resection.<sup>(1)</sup> The evolution of pedicle techniques provided a more reliable circulation to the nipple areola- complex. In the mid 1970's a number of surgeons (Ribeiro, Robbins, Courtiss, Georgiade, Wise) worked in the refinement of the inferior pedicle to improve circulation and sensation, which by far became the most popular procedure performed by plastic surgeons for breast reduction.<sup>(14-16)</sup> With the new concerns by surgeons about the pseudoptosis (bottoming out), "boxy" breast deformity and the unsightly horizontal scar with its possible hypertrophy that occurred with inferior pedicle technique, a number of surgeons (Lassus, Lejour, Marchac, Goes and Benelli) worked on a short scar technique based on a superior pedicle.<sup>(17-20)</sup> Nevertheless, these techniques had little acceptance to the plastic surgeons since some of them were concerned that these procedures were only beneficial to small reductions, with unpredictable immediate breast shape. In the 1999 Elizabeth Hall-Findlay published here modification to the Lejour superior pedicle, using the superomedial dermatoglandular pedicle, where no pectoralis fascia sutures, no undermining of the breast tissue and no or minimal liposuction was

performed.<sup>(6)</sup> By these modifications the problems that have restricted the standard vertical breast reduction to a smaller reductions had been solved. Wound-healing problems have been reduced by not undermining the skin, and the long term aesthetic results are highly superior and more natural to the Lejour technique especially in maintaining breast projection and medial fullness of the breast since it does not rely on the skin envelope to maintain shape.<sup>(21)</sup> There is no limiting age for reduction mammoplasty it was described for patients younger than 20 years of age up to 68 years old,<sup>(22,9)</sup> in our series the age ranges from 22-57 years , which is similar to the previous studies. Our patients complained of multiple symptoms; back pain, neck pain, shoulder grooving, inframammary rashes, and impaired psychological wellbeing. These symptoms are consistent with the general symptoms of mammary hypertrophy found in the literature.<sup>(23)</sup> It is proved that smoking and diabetes do increase the postoperative wound complications rates in breast reduction surgery especially wound infection and dehiscence.<sup>(24,25)</sup> Non of our patients were diabetic and two patients out of the 6 smoker patients had wound dehiscence. We applied a modified approach to the patient's marking where we marked the patients in the standing position first to determine the new nipple areola- complex then we marked the lateral and medial limbs while the patient is in the supine position, we found that this technique is easier for the surgeon than what was described originally in the literature.<sup>(6)</sup> Ahmad<sup>(26)</sup> did not find that prophylactic antibiotics in reduction mammoplasty had an effect on infection rate, however, a single preoperative dose significantly improves wound healing therefore all of our patients received prophylactic antibiotics. The reliability and safety of the superomedial pedicle in breast reduction is well documented and established now. It is also versatile with different pattern of skin excision, and can be applied to wide range of breast size even huge reduction.<sup>(27)</sup> In our study the average amount of tissue removed ranged from 250g to 2400g from each side. Similar to our experience Finger *et al* used the superomedial pedicle for reduction as large as 4100g per side, with no nipple-areola necrosis and without the need for free nipple areola grafting,<sup>(28)</sup> emphasizing on the safety of the superomedial pedicle for gigantomastia reduction.

Although The Hall-Findlay's technique as described uses the liposuction to treat the lateral

axillary fullness, no liposuction was used in all our patients; instead a direct lipectomy was done to the lateral and inferior breast pole. Studies have also shown that this technique had a shorter operative time, less blood loss, and a reduced patient's recovery time.<sup>(8,29)</sup> Although our study did not measure nipple sensation outcomes, previous studies have shown that medial and superomedial pedicles have excellent postoperative nipple sensation.<sup>(30,31)</sup>

We encountered 3 (6%) patients who had wound dehiscence at the inferior portion of the nipple-areola complex, still minor to other published studies,<sup>(32)</sup> and it did not affect the final aesthetics, neither tear drop areola nor bottoming out occurred in our patients; dog ears were dealt with intraoperatively. In our series we established a 96% satisfaction rate which is consistent with other studies.<sup>(33)</sup>

In our experience using the inverted T shape inferior pedicle, we were facing certain problems of delayed wound healing of the vertical scar, tear drop areolar deformity, and dog ears, long horizontal scar in which they were overcome by using the Hall Findlay's technique. Cruz-Korchin *et al*<sup>(34)</sup> compared the inferior pedicle/Wise pattern breast reduction with the medial pedicle vertical pattern in moderate reductions, showing that patients, followed up at 6 months, were more satisfied in terms of reduced scarring and esthetic outcome when the medial pedicle/vertical method was used.

The superomedial pedicle we used was very reliable; addressed the problems associated with macromastia and had consistently produced good results with a high overall patient satisfaction rate.

## Conclusion

This technique for vertical scar reduction mammoplasty has been applied to breast reductions of all sizes and has consistently produced a good breast shape and leaves less scarring than standard breast reductions. The technique needs good preoperative planning but it is a straightforward procedure and easy to learn, it offers a safe, effective, and predictable way for treating mammary hypertrophy.

## References

1. **Jones G.** Breast Reduction, plastic surgery, 2<sup>nd</sup> Ed. Elsevier 2006. 539-584.
2. **Hall-Findly EJ.** Vertical reduction mammoplasty, Grabb and Smith's Plastic Surgery, 7<sup>th</sup> Ed. Philadelphia: Lippincott-Raven, 2007; 604-615.
3. **Hidalgo DA, Elliot LF, Palumbo S, et al.** New trends in breast reduction. *Plast Reconstr Surg* 1999; 104: 806.
4. **Lejour M.** Reduction of mammoplasty scars: From a short inframammary scar to a vertical scar. *Ann Chir Plast Esthet* 1990; 35: 369.
5. **Rohrich RJ, Gosman AA, Brown SA, et al.** Current preferences for breast reduction techniques: a survey of board-certified plastic surgeons 2002. *Plast Reconstr Surg* 2004; 114: 1724.
6. **Hall-Findly EJ.** A simplified vertical reduction mammoplasty: shortening the learning curve. *Plast Reconstr Surg* 1999; 104(3): 748-759.
7. **Gulyás G.** Marking the position of the nipple-areola complex for mastopexy and breast reduction surgery. *Plast Reconstr Surg* 2004; 113(7): 2085-2090.
8. **Lista F, Ahmad J.** vertical scar reduction mammoplasty: A 15-year experience including a review of 250 consecutive cases. *Plast Reconstr Surg* 2006; 117: 2152.
9. **Serra MP, Longhi P, Sinha M.** Breast reduction with a superomedial pedicle and a vertical scar (hall-findlay's technique) experience with 210 consecutive patients. *Ann Plast Surg* 2010; 64: 275-278.
10. **Van Thienen CE.** Areolar vertical approach (AVA) mammoplasty: Lejour's technique evolution. *Clin Plast Surg* 2002; 29: 365.
11. **Exner K, Scheufler O.** Dermal suspension flap in vertical scar reduction mammoplasty. *Plast Reconstr Surg* 2002; 109: 2289.
12. **Pallua N, Ermisch C.** "I" Becomes "L": Modification of vertical mammoplasty. *Plast Reconstr Surg* 2003; 111: 1860.
13. **Ambaye AB, MacLennan SE, Goodwin AJ, et al.** Carcinoma and atypical hyperplasia in reduction mammoplasty: increased sampling leads to increased detection. A prospective study. *Plast Reconstr Surg*. 2009; 124: 1386.
14. **Ribiero L.** A new technique for reduction mammoplasty. *Plast Reconstr Surg* 1979; 3: 211.
15. **Robbins TH.** A reduction mammoplasty with the areola -nipple based on an inferior dermal pedicle. *Plast Reconstr Surg* 1977; 59:64-67.
16. **georgiade NG, Serfin D, Morris R et al.** reduction mammoplasty utilizing an inferior pedicle nipple-areola flap. *Ann Plast Surg* 1979;3; 211.
17. **Claude L.** Breast reduction: Evolution of a technique a single vertical scar. *Aesth Hast Surg* 1987; 11:107-112.
18. **Madeleine L.** Vertical mammoplasty: Update and appraisal of late results. *Plast Reconstr Surg* 1999; 104(3): 771-781.
19. **Góes S.** Periareolar mammoplasty: double skin technique with application of polyglactine or mixed mesh. *Plast Reconstr Surg* 1996; 97: 959-968.

20. **Bennelli L.** A new periareolar mammoplasty: round block technique. *Aesthetic Plastic Surgery* 1990; 14: 93.
21. **Davison SP, Mesbahi AN, Ducic I, et al.** The versatility of the superomedial pedicle with various skin reduction patterns. *Plast Reconstr Surg* 2007; 120: 1466–1476.
22. **Davis GM, Ringler SL, Short K, et al.** Reduction Mammoplasty: Long-term efficacy, morbidity and patient satisfaction. *Plast Reconstr Surg* 1995; 96: 1106-1110.
23. **Schnur PL, Schnur DP, Petty PM, et al.** Reduction mammoplasty: An outcome study. *Plast Reconstr Surg* 1997; 100: 875.
24. **Schumacher HAA.** Breast reduction and smoking. *Ann Plast Surg* 2005; 54: 117–119.
25. **Hanemann MS, Grottingm JC.** Evaluation of preoperative risk factors and complication rates in cosmetic breast surgery. *Ann Plast Surg* 2010; 64: 537–540.
26. **Ahmadi AH, Cohen BE, Shayani P.** A prospective study of antibiotic efficacy in preventing infection in reduction mammoplasty. *Plast Reconstr Surg* 2005; 116: 126.
27. **Landau AG, Hudson DA.** Choosing the superomedial pedicle for reduction mammoplasty in gigantomastia. *Plast Reconstr Surg* 2008; 121: 735.
28. **Finger RE, Vasquez B, Drew GS, Given KS.** Superomedial pedicle technique of reduction mammoplasty. *Plast Reconstr Surg* 1989; 83: 471
29. **Davison SP, Mesbahi AN, Ducic I.** The versatility of the superomedial pedicle with various skin reduction patterns. *Plast Reconstr Surg* 2007; 120: 1466.
30. **Greuse M, Hamdi M, DeMey A.** Breast sensitivity after vertical mammoplasty. *Plast Reconstr Surg* 2001; 107: 970.
31. **Ferreira MC, Costa MP, Cunha MS, et al.** Sensibility of the breast after reduction mammoplasty. *Ann Plastic Surg* 2003; 51:1-5.
32. **Chen CM, White C, Warren SM, et al.** Simplifying the vertical reduction mammoplasty. *Plast Reconstr Surg* 2004; 113: 162–172.
33. **Jones SA, Bain JR.** Review of data describing outcomes that are used to assess changes in quality of life after reduction mammoplasty. *Plast Reconstr Surg* 2001; 108:62-67.
34. **Cruz-Korchin N, Korchin L.** Vertical versus wise pattern breast reduction: patient satisfaction, revision rates, and complications. *Plast Reconstr Surg* 2003; 112:1573–1578.