

Review Article

Unfavourable results following reduction mammoplasty

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ABSTRACT

Breast reduction is a common cosmetic surgical procedure. It aims not only at bringing down the size of the breast proportionate to the build of the individual, but also to overcome the discomfort caused by massive, ill-shaped and hanging breasts. The operative procedure has evolved from mere reduction of breast mass to enhanced aesthetic appeal with a minimum of scar load. The selection of technique needs to be individualised. Bilateral breast reduction is done most often. Haematoma, seroma, fat necrosis, skin loss, nipple loss and unsightly, painful scars can be the complications of any procedure on the breast. These may result from errors in judgement, wrong surgical plan and imprecise execution of the plan. Though a surfeit of studies are available on breast reduction, very few dwell upon its complications. The following article is a distillation of three decades of experience of the senior author (L.S.) in reduction mammoplasty. An effort is made to understand the reasons for unfavourable results. To conclude, most complications can be overcome with proper selection of procedure for the given patient and with gentle tissue handling.

KEY WORDS

Breast; complications; fat necrosis; reduction mammoplasty; seroma

INTRODUCTION

Reduction mammoplasty aims to create proportionate, youthful looking breasts with minimal scars, having the ability to breast feed and retain normal sensations. The plan of operation is straightforward. Two choices need to be made - what incision to be given and what pedicle to be used to retain the nipple and areola. Quadrants other than the pedicle are removed; the breast shaped and redundant skin excised. An entire array of techniques has been described to achieve the above-mentioned aims. Out of these,

the Wise pattern^[1,2] access with inferior pedicle breast reduction has been the most popular. However, the vertical pattern mammoplasty has its proponents too, after the works of Lassus,^[3] Lejour,^[4] and Hall-Findlay^[5] amongst others. Benelli^[6] has advocated the circumareolar access for the operation. Especially in cases of mild hypertrophy, liposuction of the breast achieves significant reduction. Amputation of the breast with free nipple-areolar graft^[7] needs to be considered for a massive and ptotic gland.^[8,9]

PRE-OPERATIVE GUIDELINES

An informational video prior to meeting the consultant is recommended.^[10] Many Indian patients however, detest watching surgical steps.

The following details must be asked^[11] for from all patients: Age,^[12] upper body symptoms due to the pendulous breasts; history of breast cancer, pregnancy and breast feeding; smoking; hormonal or anticoagulant use;^[13,14]

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diabetes;^[14] submammary intertrigo; expectations to lose weight post-operatively; expected breast size post-operatively; requirement for other cosmetic surgeries (like abdominoplasty^[15]) simultaneously.

A physical examination is necessary to choose the right technique. The following are noted:

- Size of the breast; density of its parenchyma; ptosis^[16]
- Estimated amount of the breast tissue to be retained (this is more important than the amount to be resected)
- Body mass index (BMI) (patients with BMI >35 must be encouraged to lose weight)^[10,17,18]
- Photography (from the front and sides).^[11]

Whatever technique is chosen, the following steps have to be adhered to:

- Marking of the patient in standing position
- Midsternal line from suprasternal notch to the xiphisternum
- Breast meridian: 7.5 cm from the suprasternal notch on the clavicle, a perpendicular line is drawn onto the breast mound, which usually passes through the nipple
- The distance from the suprasternal notch to the nipple is measured
- The inframammary crease is marked. The distance from the nipple to the crease is noted. The new nipple position is marked on the breast meridian^[19] varying from 18 to 24 cm depending on the height of the individual. Err on marking the new nipple position too low, rather than too high^[13]
- The new location of the areola is marked with an areola diameter of 45 to 55 mm
- Skin incision lines are marked depending on the technique chosen. The reader is referred to masterly articles^[13,20] on the finer aspects of marking of incisions
- An informed consent is taken.

OPERATIVE TECHNIQUES - PROS AND CONS

Technique evolves with time and during the course of a career. Out of the senior author's personal experience of 468 breast reductions over the last 30 years, the inferior pedicle technique was used in the initial decade; vertical scar techniques for the next 15 years and a combination of liposuction and vertical scar in the last 5 years.

Inferior pedicle technique

The inferior pedicle technique, with a Wise pattern incision, has enjoyed universal appeal in the last half a

century. It is the standard against which all other techniques are judged^[11,20] [Figure 1]. The technique is reproducible across a range of breast sizes and with varying ptosis. It is easy to master; access to different quadrants is excellent and permits precision in shaping the retained parenchyma and the skin envelope.^[20] The lengthy operating time, scar burden and bottoming out in the late follow-up period are the drawbacks of the procedure. Again, the technique relies on the redraped skin to shape the breast, rather than the retained parenchyma.^[13]

Unfavourable results encountered with this technique are:

- Flattened, boxy shape of breast lacking projection^[20] and volume [Figure 2]
- Dog-ears on both ends of the transverse scar with prominent lateral bulges
- Loss of the nipple or delayed healing
- Hypo pigmented patch of the nipple
- Webbing of the presternal region [Figure 3].

The shape of the breast can be maintained by keeping the pedicle at least 7.5-8 cm wide and keeping the glandular element slightly more than the estimate. The superior flaps are raised from the gland with the thickness of 2 cm and then raised up to the lateral extent of the gland to retain the conical shape of the breast.

The dog ears and lateral bulges can be avoided by taking measurements meticulously. For example, if the transverse inframammary length is 22 cm, the lateral segment should be 12 cm, the medial segment should be 10 cm. The suturing should be started from the lateral side.

Nipple loss can be avoided by keeping the pedicle in a pyramidal shape, not letting it fall forwards and supporting it all the time while excising the glandular element on the lateral and medial segments.^[21]



Figure 1: Left: 20 year follow-up of breast reduction with inferior pedicle and inverted T incision. Following the procedure, the lady begot three children and all were breast fed. Right: The axillary pad of fat was removed in a second sitting, 20 years after the breast reduction

The medial and the lateral flaps can be approximated along the inframammary crease after inserting drains. The nipple-areola opening is created by incising a circle of diameter 5 mm larger than the previously incised nipple-areola.

Superior or superomedial pedicle technique

It is a safe and a reliable technique consuming less surgical time with long-term consistent results. Extensive undermining of skin flaps is not required.^[20] The shape and contour are well maintained with minimal scarring. After the basic markings of breast meridian the new nipple position is marked on it. The new areola is marked around it with a diameter ranging from 3.5 to 4.5 cm. The inferior limit of the excision should be 2-3 cm above the inframammary crease.

The pedicle can be superior or medial depending on the surgeon's choice. Most of the breast tissue is resected, inferiorly, laterally and medially.^[22] Scar if it is beyond the infra mammary fold becomes prominent and persistent. Under reduction may be the complication where the patient may still feel the size is big. This technique has proved to be reliable, but it is limited by increased difficulty in moving the nipple over longer distances.

Vertical mammoplasty

Lassus popularised vertical mammoplasty without the inframammary fold scar. It is characterised by en bloc resection of skin, fat and glandular tissue; transposition of the areola on a superiorly based flap, no undermining and a vertical scar. Reporting on 30 years of experience with vertical mammoplasty in 1350 breasts,^[3] Lassus quoted zero necrosis when the nipple is transposed no more than 9 cm.

Lejour used undermining and often combined this with

liposuction.^[4] She advises against marking the nipple too high, to keep the lower most aspect of vertical resection at least 3-4 cm (in case of small and ptotic breast) and up to 6-7 cm (in hypertrophic, ptotic breast) above inframammary fold to avoid migration of the vertical scar down on to the chest wall [Figure 4].

Circum areolar breast reduction

This procedure^[6,23] can be chosen for mild hypertrophy of a tubular breast with enlarged areola (small volume



Figure 2: Flattened breasts with loss of volume and projection. This unmarried lady presented for revision mammoplasty after undergoing reduction elsewhere



Figure 3: Left: Young girl who underwent a massive reduction. Right: Post-operative result. Note the presternal webbing

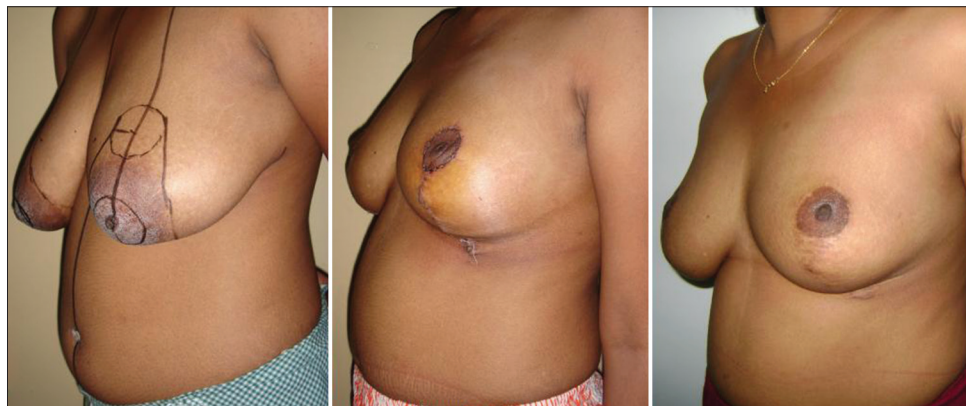


Figure 4: Left: Skin marking prior to vertical mammoplasty. Middle: Post-operative result. Right: Late follow-up. The vertical scar below the inframammary crease is still prominent

reduction with mastopexy^[20]). The incision is made around the areolar perimeter and the required size of areola is preserved. The rest of the areola is excised like a de-epithelised skin flap. The incision is deepened in the lower half of the areola and the required amount of breast tissue is excised. The wound is closed in three layers. The deeper suture is with a non-absorbable suture. The second suture layer is to reduce the gap further and skin is closed with interrupted sutures. This technique aims to avoid a visible stitch line. This procedure can be preceded by liposuction, which helps in reducing the volume [Figure 5].

The unfavourable results of this procedure are:

- Inadequate reduction of breast as there is limitation in exposure
- Removal of excess skin via a periareolar route may result in a flat appearance^[20]
- The scar around the areola may become prominent, hypertrophic and may take a long time to settle.

Liposuction alone as a breast reduction procedure

This is very effective and useful in unmarried girls leaving no visible scar and no other morbidity such as haematoma, seroma and nipple necrosis. The ideal patient for such a procedure^[24] is a young patient with juvenile fatty breast parenchyma with good skin elasticity and tone. For better assessment, a preoperative mammography may be of great help.

Moskovitz *et al.*^[25] conducted a survey to know the outcome of the liposuction for breast reduction. The survey revealed that 80% were satisfied with the result and would go on to recommend it to a friend. Thus, it can be considered as an effective method of breast reduction.

POST-OPERATIVE CARE

Dressing to support the breast is essential with a facility to inspect the nipple and areola without opening the



Figure 5: Left: 17-year-old girl with unequal tubular breasts. She underwent liposuction and circumareolar breast reduction. Right: Post-operative result

dressing. Intravenous antibiotic started just before incision is continued until the patient resumes oral intake. Drains can be taken out on the 1st post-operative day usually. A snugly fitting bra can then be provided. With no scientific merit in prolonged antibiotic treatment, these can be withdrawn after 5-7 days.^[26] Skin staples, if used, are removed on the 6th post-operative day. If the absorbable sutures on the areola do not drop off in a week, they are snipped out.

PREVENTION, ANTICIPATION AND TREATMENT OF SPECIFIC COMPLICATIONS

Complications are to be anticipated in reduction mammoplasty - reported percentages are as high as 53%.^[27,28] The chance of a complication increases as the quantity of resection increases. Of these, the most common is delayed wound healing [Figure 6]. Haematoma, fat necrosis, nipple necrosis, cellulitis and fungal dermatitis have all been reported. Probably, the highest reported percentage (in large series) of women dissatisfied with the surgery is 18.4%.^[29] Appearance of scars and asymmetry can be causes for complaints.^[30] Plastic surgeons must not forget that despite the high percentage of complications, most patients accept and recommend the procedure.^[12,14]

Skin loss and delayed wound healing

When closure is too tight or the flaps are thinned excessively, the chances of wound breakdown increase. This is most often found at the junction of two scar lines. In the Wise pattern, this is at the junction of the inverted T; in vertical mammoplasty, at the meeting point of the scar at the nipple-areola complex and the vertical limb.

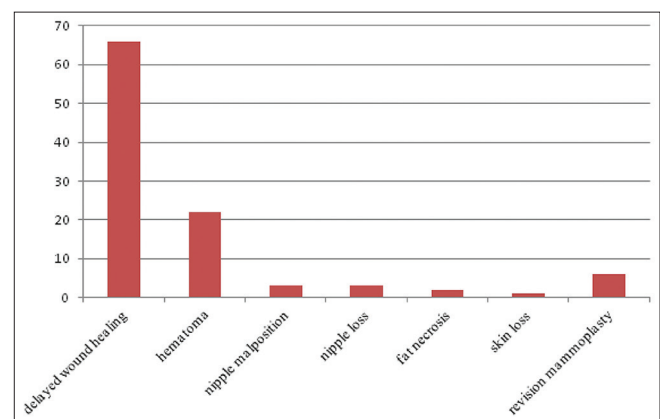


Figure 6: Complications encountered in the senior author's practice of 468 reduction mammoplasties over three decades

When area is small, it is self-limiting. If associated fat necrosis is also present, debridement and dressings are needed until healing is complete and revision of scar can be planned at a later date. A conservative approach of debridement and dressing helps, until granulations appear. The raw area can then be skin grafted.

Especially in patients with high BMI, antibiotic coverage for at least 5 days may be useful to prevent delayed wound healing and dehiscence.^[31]

Hematoma

This is a common complication seen with all types of breast reduction. A haematoma is the number one cause leading onto wound problems. It can be prevented by meticulous haemostasis and avoiding shoulder movements of the patient for 2-3 days post-operatively. When in doubt, exploration and evacuation under anaesthesia with closed suction drainage would help. If left untreated, it can result in fat necrosis, skin sloughing, and nipple loss [Figure 7].

Nipple-areola necrosis

Blood supply from the internal mammary perforators to the nipple-areola complex is the most reliable.^[32] Necrosis of the nipple is a dreaded complication. The incidence varies and

is related primarily to decreased vascularity of either the skin flaps or the pedicle in which the nipple areola complex is based. Laser Doppler flowmetry^[33] and fluorescein angiography^[34] have been tried as preventive measures.

A meticulous observation of the areolar circulation in the first 48 hours would warn about this complication. If persistent cyanosis is noticed, identification of the problem and immediate intervention in the operating room might salvage the nipple. Sutures may be removed; a haematoma sought for and vascularity of the nipple reassessed. Sometimes venous congestion may improve with leeches, depending on the availability and willingness of the patient. Early conversion to a free nipple graft is described. The nipple has to be grafted onto deepithelialised dermis,^[13] not the underlying fat. If these measures fail, reconstruction of the nipple-areola at a later stage becomes mandatory [Figure 8].

Fat necrosis

This dreaded complication is due to vascular compromise to the parenchyma along with haemorrhagic necrosis. Small areas may not require intervention especially when there is no skin necrosis. If skin and fat necrosis is excessive and associated with infection,^[35] surgical



Figure 7: Left: The lady underwent the Wise pattern inferior pedicle breast reduction with removal of 1800 g from the right side and 1700 g from the left side. Middle: Post-operatively, the right areola was dusky, with a lot of local ooze. A hematoma was drained at 48 h. Right: Nipple loss on the right side



Figure 8: Left: 19-year-old girl underwent a combination of liposuction and open reduction. Middle: Wound breakdown on right side. Patient was lost to follow-up. Right: Late result, with loss of projection of nipple and depigmented areola



Figure 9: Left: 20-year-old girl underwent a superior pedicle vertical mammoplasty with removal of 950 g from right side and 935 g from left side. Middle: Post-operative result. Right: 1 year after, she requested for revision of the right areola. An ellipse has been marked on the superior aspect for excision

debridement, secondary closure and grafting may be needed at a later date.

The skin and nipple-areola complex may be involved; discharge may be evident followed by cellulitis and fever. Sometimes, it may be mistaken for tubercular mastitis and takes a long time to heal.

Nipple retraction

Minimal nipple retraction seen as a result of tension in suture line or weight of pedicle on the areola usually resolves in a few days. A grossly retracted nipple might need correction by thinning the dermal pedicle wherever the tension is more. If it persists for a long time, secondary correction may be advisable after 6 months, by division of the scar contracture.

Secondary breast deformity; changes in shape and bottoming out

Secondary breast deformity may be due to choice of wrong technique or error in judgment.^[11] Minor but noticeable breast asymmetry can be treated with liposuction.^[36] Larger asymmetry entails revision surgery, after at least 6 months. Pseudoptosis can be tackled with a horizontal elliptical excision from the inferior aspect.^[37]

Hypertrophied and symptomatic scars

Hypertrophy is common after inferior pedicle breast reduction in the inframammary scar. Upto 15% of all scars are thick, itchy or uncomfortable.^[12] Taping the scar for several weeks is a simple measure to offset the tendency. Hypertrophy can be treated with intralesional steroid injections and silicone gel sheet.

Nipple-areola malposition

Minor asymmetry of position (difference of about a centimetre) can be managed with a crescentic excision

on the desired border of the areola^[13] [Figure 9]. Major asymmetry requires circumferential release of the nipple. A nipple which is set too high is the most difficult to reset.

Nipple sensation

Patient needs to know that dysaesthesia over the nipple may persist for a year and that recovery usually occurs. Good sensibility has been reported with the inferior pedicle technique.^[38] Sexual sensibility is decreased at least in 50% of the subjects, but can recover.^[14] Though rare, improved sensation has been reported too.^[39]

Problems with lactation

Thibaudeau *et al.*^[40] concluded that women can lactate (at least for the 1st month post-partum) and must be encouraged to breast feed even if they had undergone breast reduction in the past. However, insufficient milk may be a reason for adding supplements.

Breast cancer

The incidence is 0.5-0.8% in large series.^[13]

Reoperation and revisional reduction

Reoperation for complications is generally of the order of 5%^[28] to 6.5%.^[12] This is mostly done for scar revision. Few articles describe repeat reduction mammoplasty.^[36,37,41] Juvenile mammary hyperplasia is probably one indication. Retaining the original pedicle is recommended.^[37]

CONCLUSION

Reduction mammoplasty enjoys excellent patient satisfaction levels. However, complications may occur even in the most suitable candidate. Knowledge of the anatomy, meticulous pre-operative planning, gentle tissue handling and anticipatory post-operative care will reduce the incidence of untoward results.

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