

Inferior Pedicle Technique in Breast Reduction

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Indications

Indications for breast reduction, for whichever technique, include either a) self-identification of problems or b) referral from another health care provider, or c) for symmetry related to a lumpectomy or mastectomy for contra-lateral breast cancer

Because of the wide dissemination of knowledge facilitated by the proliferation of health related websites, prospective patients are often able to self-diagnose the cause of the stereotypical symptom cluster of macromastia. Through surfing of plastic surgeons' websites, the woman seeking breast-reduction will often have gained a reasonable fund of knowledge regarding the benefits that breast reduction may offer. She is likely to become well educated on the range of techniques on offer, on the likely functional and cosmetic outcomes, and the expected aesthetic shape. It is, of course, the in-person surgical consultation with an appropriately trained and credentialed plastic surgeon that can help confirm the diagnosis, clarify the patient's do-it-yourself understanding, and correct any mis-information that the woman may have received. Some women are free of physical symptoms and seek breast reduction solely for aesthetic purposes. Yet all women want an aesthetically proportioned breast shape delivered along with volumetric reduction.

Others women get referred for a plastic surgery consultation from their primary care physician, gynecologist, chiropractor, or spine specialist for symptoms of back pain, neck pain, shoulder grooves, breast pain, intertrigo in the infra-mammary folds (IMF), inability to exercise or participate in sports, inability to fit into clothes, etc. Most have failed some attempt at conservative management—such as physical therapy, exercise, weight-loss, massage, or NSAIDs. Attempts at weight loss are a catch-22; inability to exercise because of neck, back, and

shoulder pain impedes their ability to lose weight, and thus the macromastia persists. Since the underlying problem of large pendulous breasts remains uncorrected, it does seem illogical that conservative measures would suffice—women would have to be undergoing lifelong PT or lifelong NSAIDs and be at risk for adverse renal and gastric effects of NSAIDs¹².

Given the high incidence of breast cancer in North American women, many patients undergo a lumpectomy followed by radiation therapy. This leads to fibrosis, breast volume loss, and contraction of the breast. Alternatively, if a woman has had a unilateral mastectomy followed by reconstruction (autologous or prosthetic based) that tends to have less ptosis and is smaller because of limitations in donor site availability. The normal un-operated breast will continue to age and have more ptosis and be larger. Hence, women may seek a unilateral breast reduction to match a side that has been treated for cancer.

Consultation

A detailed history is obtained to ensure that the patient is suitable for surgery from medico-surgico-psychosocial perspective. A notable family history of breast cancer should be worked-up for genetic susceptibility (BRCA testing). This may precipitate bilateral mastectomy and immediate reconstruction instead of bilateral breast reduction. Mammograms are obtained as necessary to bring them up-to-date with current guidelines for baseline mammography and screening for breast cancer. American Cancer Society guidelines recommend a baseline mammogram at age 40 and annually thereafter for women of average risk. Any detected anomalies should be referred to a breast oncologic surgeon to ascertain need for biopsy, imaging, or deferring surgery to observe any suspicious radiographic abnormalities over time.

During the consultation process, measurements are undertaken for both the medical record as well as for third-party payor coverage criteria documentation. Typically, height, weight, sternal notch-nipple distance, and nipple to IMF distances are recorded bilaterally and discrepancies in IMF position and nipple-areolar-complex (NAC) position are pointed-out to the patient. The degree of ptosis (none, mild, moderate, or severe) is assessed. During the focused breast exam, the breasts are screened for masses or nodules, axillary lymphadenopathy, the skin for ulcerations, erosions, or post-inflammatory hyper-pigmentation. Nipple discharge is ruled-out, and NAC size is noted (small, average, or dilated). Standard view photography of the patient is done.

Lalonde Breast sizers or a water-displacement technique can be used to estimate the volume in each breast³. With newer digital imaging technologies, it may be possible to estimate the volume from stereo photography.

Current bra-size is elicited and the desired cup-size is discussed with the patient. Patients don't always understand the bra sizing system and some request going from a 38DD to a 32 B for instance. The band-size usually will not change (unless axillary liposuction is also done) since this reflects the under-bust chest circumference. Ranges for volume resection that correlate with each 1 cup size reduction range from 200-350cc, with little consensus. Some heavy-set women request a small breast cup-size and should be counseled about choosing a cup-size that is proportional to their overall body-habitus. Lastly, cup-size serves as a lay parlance discussion tool only. Cup-sizes vary significantly by bra manufacturer and these are not medical measurements. They serve as general guideposts to facilitate dialogue about their desired target size.

The volume to be resected in each side, which may be different based on pre-existing asymmetries, is estimated. Broad generalizations suggest that approx. 200-350 gms make one-cup size change, and that each 1cm of asymmetry in NAC position between the breasts accounts for 100gm of breast volume asymmetry. Most insurance companies establish volume requirements of breast tissue to be resected to re-imburse for the procedure. While there are many variations, some third-party payors require 500 gm resection at least. Other companies use a nomogram based on height and weight which determines how much breast tissue is removed to be eligible for re-imburement.

Insurance Systems

Pre-authorization from insurance companies is sought with a copy of the consultation and the above measurements, photographs of the torso in frontal and lateral views, and ICD 9 and CPT codes. The codes frequently utilized in conjunction with breast reduction symptomatology are 611.1 (breast hypertrophy), 611.71 breast pain, 692.9 intertrigo, 724.8 symptoms referable to back, 724.1 back pain, 723.1 neck pain, 723.9 shoulder pain, 738.3 shoulder grooves, 709.0 and dyschromia. The CPT code is 19318-50.

When coverage for breast reduction is denied, an appeal letter may be considered, reminding the payor that recent scientific literature and evidence-based studies published in peer reviewed journals strongly support the position that women undergoing reduction mammoplasty for symptomatic breast hypertrophy experience significant improvement in their preoperative signs and symptoms. Managed care organizations rate outcome or cost-effectiveness analyses as the most important factor in determining reduction mammoplasty coverage policies⁴. The plastic surgeon's office can often facilitate the appeal process but the ultimate responsibility rests with

the patient. The objective, ethical, and honest account of the patient's health care problem is captured in the office consultation note prepared by the doctor and a copy may be provided directly to the patient, supplemented with photographs. The patient may be encouraged to contact her payor or employer directly about her dissatisfaction.

Some women will pay for services out-of-pocket in the face of denial, and/or use their flexible health savings accounts to fund the surgery.

Breast reduction performed unilaterally to correct asymmetry with a reconstructed post-mastectomy breast is covered by insurance without regard to size and volume criteria, as mandated by the WHCRA of 1998(**check facts).

Pre-Op Discussion

After a thorough medical history and physical, the patient is screened for outpatient surgery. Smoking or second-hand smoke exposure must be stopped for 6-8 weeks prior to surgery. Nicotine exposure via gum or patch is also eliminated. A newer non-nicotine containing medication, varenicline may be initiated. Patients should additionally remain smoke and nicotine free for the post-op healing period of at least 6 weeks.

Weight-loss, if indicated, is desirable to get closer to ideal body weight, but this is frequently unrealistic as discussed earlier.

Pre-operative testing is directed by medical history, physical findings, and age per anesthesia criteria. Young healthy women may not need any testing except for an H&P. Those with medical illnesses may need a CBC, Electrolytes, LFT's, PFTs, CXR and/or EKG. Those with a significant cardio-pulmonary history should be cleared by their internist or cardiologist.

The patient is instructed to stop medications that pre-dispose to a bleeding diathesis such as NSAIDs, aspirin, salicylic acids, and over-the-counter medications that may contain these ingredients. Herbal medications and vitamin supplements, especially in large doses, are also eliminated. In particular, vitamin E, ginkgo biloba, St. John's Wort, and Garlic are to be discontinued.

Estrogenic medications such as oral contraceptive pills (OCPs) and post-menopausal hormone replacement therapy should be discontinued to lower the risk of deep-vein thromboses (DVTs) and venous thrombo-embolism (VTE) associated with surgery. Those on OCPs should practice an alternate form of contraception in the pre and post-operative interval because OCPs (even when not discontinued) may have decreased effectiveness due to metabolism of other medications during the episode of surgical care.

During the consultation, the patient and her significant others are educated regarding the risks and benefits of breast reduction surgery, as well as the alternative techniques available such as a) no surgery and attempting weight loss, b) breast liposuction, c) peri-areolar incision, d) vertical pattern or short-scar, e) transverse scar (Passot), or f) Wise pattern breast reduction.

Having no surgery and seeking reduction in breast size through exercise and weight loss is also a possibility, especially if she can achieve a weight loss to get to a normal BMI. She may then be re-evaluated at some future date to see if she still needs a breast reduction, or only a mastopexy. Breast liposuction may be successful in decreasing one or two cup sizes for some women with moderate hypertrophy without mild to moderate ptosis, and should be considered. Liposuction does not address NAC ptosis and may worsen ptosis. Peri-areolar techniques may have a role in mild hypertrophy but remain technically challenging and unpredictable. Vertical or short-scar

reduction has the advantage of eliminating the transverse IMF scar; however, this has a 15-20% revision rate with possible future or intra-op conversion to a Wise pattern or J or L-scar. These breast reductions do not achieve their optimal shape right away and do so over time. This is less likely to have bottoming out or parenchymal maldistribution (pseudo-ptosis). Transverse scar technique is typically used with a supero-medial or superior pedicle and/or with free nipple graft. However, the inferior-pedicle reduction technique can be used with the transverse scar.

The Wise skin pattern is most commonly associated with the inferior pedicle breast reduction technique. This incision pattern can however be used with superior or supero-medial pedicle techniques, as well as with free nipple grafts.

Nevertheless, the Wise or inverted-T scar technique is most commonly associated with the inferior pedicle technique. The inferior pedicle breast reduction in combination with the anchor-T incision remains the most popular method of breast reduction, and most predictable⁵. Approximately 75% of plastic surgeons in the United States use this technique and approximately 50% of surgeons use this technique exclusively. It is simultaneously the most versatile and has a straight-forward learning curve. It bears emphasizing that pedicle and skin pattern can be chosen independently of each other in most, but not all, scenarios.

Consent

The written informed consent is a supplement to the patient education process that occurs during the consultation. It should cover the risks including, but not limited to, infection, bleeding, hematoma, seroma, wound dehiscence, delayed healing, poor healing, and swelling. The patient is told about the potential for scarring such as keloids, hypertrophic scar, hypo or hyper-pigmented dark or pink, itchy, or tender scars, which may be visible outside or through garments.

Adverse sequelae include asymmetry, numbness, stiffness, pain, chronic pain or anxiety and/or depression related to changes in body-image. The patient is informed of the chance for further unplanned surgery with its additional risks, financial responsibilities, and time required for surgery and recuperation. Potential hospitalization may not be covered by her insurance, since most reduction mammoplasties are done as outpatient cases at ambulatory surgery centers.

Urine pregnancy tests are recommended. If she is pregnant, she could be exposed to medications and anesthetics that cause birth defects or miscarriages.

There is the potential, but fortunately extremely rarely, for blood transfusion with major surgery and the accompanying risks including bacterial and viral infection (e.g. HIV, Hepatitis) and transfusion reaction.

There may be partial or total flap and tissue loss, fat necrosis, and loss of skin or of the NAC. Incomplete relief or no relief of the symptoms (e.g. back-pain, neck-pain) may occur, or she may be dissatisfied with the results of the surgery. No guarantee can be made of fitting into a particular clothes size or bra cup-size or to match a digital simulation. Any surgery of the breasts leads to scars, both internal and external, and hence may hinder cancer surveillance and detection efforts. MRI's may be required instead of mammograms for follow-up of calcifications from surgery.

Those patients who travel a great distance to a particularly well regarded surgeon may incur higher risks associated with traveling soon after surgery (flying, driving, etc.) such as DVTs/PEs from immobility in confined car or plane travel.

Co-morbidities must be addressed in the informed consent process as well. For instance, obesity and diabetes (controlled or uncontrolled) may contribute to poor healing and raise the rates of infection.

After discussing best case, worst case, and average outcomes and scenarios and having looked at representative photographs/diagrams the patient and her family can feel comfortable that they grasp the likely benefits and potential for untoward events. They must understand the diagnosis, medical necessity vs. elective nature of the surgery, goals of the procedure, pain management, expected time course of recovery and management of complications should they arise, and warning signs & symptoms of complications. Patients are provided sufficient time to consider the procedure in depth and should demonstrate their comprehension by being able to relate the information back to the surgeon and voice their understanding of the procedure in plain, lay language.

Cautions Contra-indications

Recent post-partum state where breast size is still changing and hasn't reached an equilibrium plateau from involution. Actively lactating patients similarly are a contra-indication to breast reduction.

Age must be considered as well – with earlier and earlier age of thelarche and menarche in Western women, teen-aged girls are encountered with greater frequency with symptoms of macromastia, some of which is related to higher obesity rates in teens. The decision must be tailored to the physical findings, expected future growth, maturity level, and willingness to accept the potential for a repeat reduction mammoplasty in the future. There are no absolute age-related criteria, and the decision to operate is multi-factorial.

Prior irradiation for breast conservation therapy (BCT) after lumpectomy is not a contra-indication, but should be given due consideration as it may precipitate the need to alter the surgical plans. If an infero-central lumpectomy has been performed, then the vascularity for an inferior-pedicle reduction may not exist, and the plan should be changed in favor of an alternate pedicle. Radiation itself, independent of the lumpectomy site, will lead to slight modification of the surgical plans. For instance, the skin-brassiere is not undermined widely, and in general, more conservative markings are utilized.

Similarly, a prior breast reduction may be a contra-indication to an inferior-pedicle technique. Previous operative notes should be obtained when practical, since the inferior-pedicle may have been resected during the surgery. Even if the prior reduction was an inferior-pedicle, the risks of injury to the pedicle and consequent loss of the NAC are, nonetheless, possible⁶.

Diabetes, being a disease that compromises microvascular circulation, poses a challenge in breast reduction surgery. In this situation, as for radiation, the skin brassiere is not undermined as widely, pedicle width is enlarged, and longer distances for NAC are not transposed. Failure to modify the markings and extent of the reduction can contribute to higher rates of fat necrosis, nipple-areola complex necrosis, and skin-necrosis, particularly at the T-junction.

Active smoking is a contra-indication. Patients are insisted to be tobacco and nicotine free for a period of several weeks prior to surgery. This includes abstinence from nicotine gum or patch and from second-hand smoke exposure. Urine cotinine tests may be indicated to encourage compliance. Urine cotinine tests are reported to detect tobacco use as recent as 2-10 days. Rarely, a carboxy-hemoglobin (CoHb) test is indicated from an arterial-blood gas (ABG) sample in the pre-op holding area. Despite efforts to persuade and educate patients into smoking

cessation for their own benefits, non-compliance is oft-encountered. Even with compliance, higher rates of complications are expected because of the aggregate toll that smoking has taken on their tissues.

A high body-mass-index (BMI) is not an absolute contra-indication, but may contribute to an overall anesthesia or surgical contra-indication. The goals of getting patients into a 10-15% range of a normal BMI are not realistic. These patients find it impossible to exercise and thus difficult to lose weight precisely because the symptomatic macromastia makes them unable to exercise.

Very large reductions or those with dramatic ptosis and long sterna notch to nipple distance risk devascularizing the NAC and should be handled with a free nipple graft technique rather than an inferior-pedicle.

When several of these cautionary findings are found in conjunction – such as diabetic who smokes or a previously radiated patient who also smokes, the surgeon must consider delaying the surgery until one or several factors can be optimized or mitigated.

Markings:

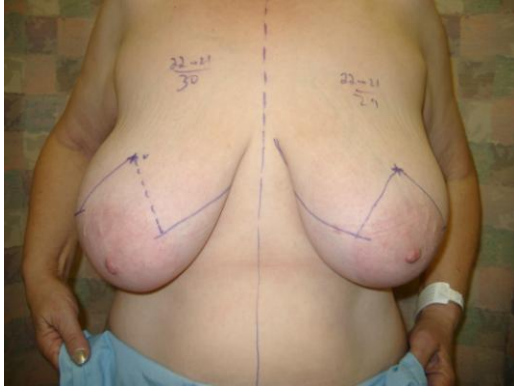
Markings, which determine the entire operation, except for some minor intra-operative adjustments, are done with the patient standing upright with arms adducted. Shoulders are placed squarely and a midline reference line is drawn from the sternal notch to the umbilicus. Existing scoliosis and kyphosis of the spine and asymmetries are demonstrated to the patient. The IMF's bilaterally are drawn with an indelible surgical site marker. The IMFs are typically 21-25cm from the sternal notch, and about the level of the mid-humeral point.

The mid-breast lines are drawn vertically through the nipple to the IMF with the breast weight gently supported to decrease stretch traction on the supra-areolar skin. Obstetric calipers may be used to transpose the level of the IMF on to the anterior supported breast skin, or this can be done through bi-manual palpation: the new nipple position is determined by placing a finger in the IMF and marking the anterior projection on the vertical mid-breast line. This mark is confirmed against several landmarks including the mid-humeral point, or within a range of 18-24cm from the sternal-notch, and in comparison to the contra-lateral side.

Once the provisional neo-NAC position is chosen, two oblique lines (which when closed will be vertical limb of the T-incision) are dropped to make an inverted V. The vertical limbs are set to 4.5-7cm to allow for future bottoming out. The limbs may be drawn with the assistance of a NAC template such as a McKissock Keyhole Pattern. The angle of divergence of the vertical limbs (which form an inverted V) is determined by the skin excess, as judged by pinching the excess skin. The greater the skin, the wider the V will open. At a first approximation, the limbs of the V should be tangent to the NAC since the dilation of the NAC is typically proportionate to the degree of hypertrophy. When in doubt, the V should be made narrow since more skin can be excised during the tailor-tack phase. If too much skin is resected then primary closure may not be possible—a mistake to be avoided.

Finally, a horizontal line is drawn from the inferior end-point of the vertical lines to the IMF. They need not extend all the way to the medial extent or the lateral extent of the breast—a pearl gleaned from experience with the vertical-only approach. The horizontal lines meet the IMF a 1-4 centimeters from the lateral sternal border and roughly at the lateral limit of the breast crease.

[FIG 1a Legend: Right sternal notch to nipple distance is 30 pre-operatively and 29 on the left. The IMF is at 22cm bilaterally and the neo-NAC will be sited at 21 cm bilaterally.]



[FIG 1b Legend: Oblique view]



[Fig 1c Legend: Post-op Result at 3 months post-operatively, frontal view]



[Fig 1d Legend: Post-op Result at 3 months post-operatively, oblique view]



Operative Details:

The patient is scheduled as an outpatient procedure for 2-3 hrs, and admitted to the hospital only if necessary. Criteria for conversion to in-patient or 23-hr observation unit include presence of medical co-morbidities, high-blood loss, long surgical duration, uncontrolled post-operative pain, intractable post-op nausea and vomiting (PONV).

In accordance with the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) guidelines for surgical infection prevention (SIP), pre-operative antibiotics targeted at skin-flora for a clean case are administered intra-venously within 60 minutes prior to incision. They are discontinued 24 after surgery. First generation cephalosporins are most-commonly indicated in the non-penicillin allergic patient to minimize surgical-site infections (SSI).

Venodynes should be applied and activated prior to the induction of anesthesia. Chemoprophylaxis for VTE is administered when the patient is considered at elevated risk for DVT. Unfractionated Heparin, low molecular weight heparins (LMWH) such as enoxaparin or dalteparin, or synthetic anti-thrombotics such as fondaparinux may be administered pre-op and continued post-operatively for chemical prophylaxis of thrombotic events⁷.

The patient is positioned supine with arms abducted to approx 90 degrees, in a well-padded and cushioned fashion. A lower body warmer is utilized to maintain normothermia during the operation.

General anesthesia is commonly utilized via an endo-tracheal tube, a laryngeal-mask-airway (LMA) or total intravenous anesthesia with agents such as propofol, midazolam, and fentanyl. Alternate techniques include spinal anesthesia or IV sedation with local anesthetics. When IV sedation is used as for anesthesia, then infiltration of local anesthetics as a field block is requisite⁸. However, even when general anesthesia is employed, a local field block or intercostals blocks with the addition of tumescent anesthesia may help provide long-lasting post-operative pain relief and thus minimize use of post-op narcotics. Some surgeons place in-dwelling catheters with pain-pumps for post-op pain management.

The use of tumescent infiltration (dilute lidocaine and dilute epinephrine solution) is utilized by some for the additional benefit of hydrodissection and local hemostasis.

Assistants at surgery are utilized to help retract, suction, and expedite wound closure, thus minimizing the operative time and anesthetic experience. A smoke-evacuator may be utilized during the surgery to minimize the smoke plume associated with the electro-cautery.

The planned pedicle is an 8cm wide area centered about the breast meridian originating at the IMF and continuing to the level of the NAC. For larger reductions, the width should be increased to 10cm wide. The pedicle is de-epithelialized except for the NAC which is left intact as a 42mm or 45mm diameter circle. The NAC can be cut as a perfect circle using a Freeman Cookie Cutter, or small undulations and imperfections (like a running W-plasty) are tolerated to mimic a more natural NAC. The superior skin flap is elevated to reveal the underlying breast

parenchyma. An omega or horseshoe shaped excision of parenchyma is performed, leaving a broadly attached 8 cm wide pedicle originating at the IMF and continuing to the level of the NAC. The pedicle that remains is vascularized by branches from the lateral thoracic, internal mammary and intercostals vessels.

This excises tissue from the medial, superior, and lateral quadrants of the breast. Some prefer to resect tissue from each area separately which is not as efficient as an *en bloc* excision, but affords the opportunity to compare and shape each region more selectively. Medially, the tissue must not be over-resected, so as to optimize cleavage. A layer of loose areolar tissue should be left on the pectoralis fascia to preserve the nerves travelling in this plane. The specimen from each side is separately labeled and weighed.

Finally, a tailor-tack method is used to shape the breast. The surgeon shapes the breast by transposing the pedicle cephalad and supporting it with medial and lateral breast flaps. Skin staples or provisional sutures are used to create guidelines for closure. Then the patient is sat up intra-operatively and size, shape, and symmetry are assessed.

If the desired target size is not reached, additional piece-meal tissue may be excised from the pedicle or from the surrounding flaps. Differential resection is undertaken from each breast to account for pre-existing asymmetries in size. Symmetry must be assessed, and if asymmetry exists, additional tissue may be excised unilaterally. Sterile Lalonde sizers may be used intra-operatively to judge symmetry of retained volumes. Once the desired volume of resection to achieve the requested bra cup-size is achieved, the specimen may be sent to pathology, individually labeled for left and right side. A request to use intra-operative weights is sent with

the specimens to pathology since there may be some volume loss related to specimen desiccation post-op.

The remaining pedicle and flaps are finally assessed for adequacy of vascularity. Healthy uniform punctuate arterialized bleeding should be confirmed from the de-epithelialized pedicle and its edges. The NAC should have good turgor and demonstrate contractile areolae. If there is a question, it may be pin pricked with a 25-gauge needle to assess pink bright bleeding. Rapid, dark congested blood suggests venous insufficiency. Another technique is to administer intravenous fluorescein and inspect the surgical site with a Wood's ultra-violet lamp and to visualize fluorescence along all concerning areas to assure viability and vascularity.

All areas are irrigated with warm saline and hemostasis is meticulously confirmed. Electrocautery is typically used for the smaller vessels, but suture-ligation of larger vessels may be needed.

Shapes are optimized by advancing the medial and lateral skin flaps to help shape the breast parenchyma. Additionally, the flap is advanced superiorly and shaping sutures may be used to create a fuller central mound that is less dependent on skin support. This shaping technique is less effective in setting of fatty breasts and has better outcomes with breasts with a greater glandular component that can hold suture. The patient is sat up again and the positions for the neo-nipple-areolar complex are chosen. They should be placed at the point of maximal breast projection at a distance of 5-7cm from the IMF. In larger breasts, one must be careful not to let the NAC fall too laterally or too high. If skin quality is poor, one can anticipate some future "bottoming-out" or pseudo-ptosis and place the NAC a little lower. Once the neo-NAC is

marked with a cookie-cutter, the 38-45mm diameter circle of skin is excised and the NAC is exteriorized and anchored with 3-0 inverted vicryl suture.

[Fig 3a Frontal view pre-op]



[Fig 3b lateral view pre-op]



[Fig 3c Frontal view post-op at 6 months, glandular shaping sutures used to avoid bottoming out]



[Fig 3d Lateral view post-op]



NAC viability should be assessed at this point. If there is good 2-second capillary refill with neither sluggish nor brisk refill, then closure is continued with 4-0 monofilament absorbable suture. If there is a question of viability at this point, the sutures should be realized, the wounds inspected for hematoma causing pressure on the flap, kinking of the pedicle, or undue tension from a tight skin-closure. If correcting these potential causes of vascular insufficiency to the NAC doesn't restore vascularity, the NAC should be harvested as a full-thickness skin graft. After defatting, it can be grafted onto a de-epithelialized circle on healthy breast skin flaps.

Drain use varies widely. Some surgeons use no drains, others only overnight, and some for a week or until drainage is lower than approximately 30cc/24 hr period. There is no difference in hematoma, seroma, or overall complication rates with or without drain use⁹.

Concomitant axillary liposuction may be undertaken during breast reduction as an adjunct technique. This may not be covered by insurance and prior arrangements should be made by the patient to address any fees for the surgeon, facility, or anesthesia associated with this. Liposuction may decrease the chest wall diameter by several inches, allow for better contouring of the lateral breast, and help prevent dog-ears in the incisions. It permits better fitting brassieres post-operatively and can address unsightly bulges towards the lateral chest wall. Super-wet technique employs infusion of tumescent solution in a proportion of approximately 1:1 or 2:1 with the anticipated volume of aspirate. A traditional or power-assisted cannula in the 2-4mm range is utilized to aspirate fat in a smooth, graduated, and tapered fashion to contour the lateral chest. Ultrasonic or Laser energy is typically not needed in this soft fat. The portal for liposuction may be placed through a separate stab incision that might be re-purposed for a drain exit site (if one is used), or the cannulae may be placed from within the breast reduction incisions, thus minimizing additional scars.

Final closure of all incisions is typically with 3-0 monocryl deep-dermal and 4-0 monocryl subcuticulars. The NAC may be closed with running 6-0 fast-gut. Incisions may be dressed with surgical adhesive glue or steri-strips. After dry sterile dressings are applied, the patient is then placed into an appropriate size surgical bra for support.

Post-Op Care

Antibiotics are stopped 24 hrs after surgery. Oral narcotic analgesics are continued as necessary – typically one week, and then NSAIDs can be initiated for both analgesia and as an anti-inflammatory. Post-op nausea and vomiting is managed with anti-emetics as needed. Hydration and stool-softeners can mitigate the constipative effects of narcotics.

Patients are allowed to shower after 48 hrs, with or without drains. Steri-strips may fall-off by themselves at this stage.

Patients should be active and ambulating on the night of surgery and may increase to brisk walking in 3-5 days post-op. Running and other jarring motions should be avoided for 4-6 weeks post-op, but elliptical machines or stationary bicycle work can be started in 2 weeks. Patients are dissuaded for lifting objects greater than 10 lbs for 2-4 weeks. After 6 weeks they may resume more strenuous aerobic work and lifting activities as tolerated.

Scar management and optimization is begun at about 4 weeks after surgery. Silicone gel sheets can afford better scars, as can scar massage with creams or vitamin E oils.

[Fig 4a – long term shape, notice fading of scars in this African-American patient]



[Fig 4b – close up of incisions]



Gentle massage of scars and breasts is encouraged at 3-4 weeks to help scars mature as well as to desensitize scars and encourage return of skin sensibility. Areas of prolonged numbness (such as lateral chest after liposuction) tend to be perceived by patients as “fat”, much as a numb lip after a dental block tends to feel fat. Warm compresses may be applied, with the caveat that an insensate area can suffer a burn if compresses are too warm or applied for too long an interval.

Patients return to the use of a normal bra or camisole at 4 weeks.

Complications:

While major complications are unusual, minor complications are frequent. Small areas of delayed healing are frequently identified at the T-junction at the level of the IMF, and these heal with local wound care such as antibiotic ointment (e.g. bacitracin) and a band-aid. For larger areas of skin loss, wet to dry gauze dressings may be prescribed. If a dry eschar forms, it may be treated with silver sulfadiazine 1% topical ointment bid until it separates. Rarely, larger areas of full-thickness skin loss may need operative debridement, and closure with a negative pressure device (vacuum assisted closure) or rarer still, with a skin graft.

If a hematoma is observed, it may be observed if it is small, non-infected, and not compromising the skin. The risk of developing calcifications around the hemorrhage exists. A hematoma may be needle aspirated—a liposuction cannula is particularly effective. For larger hematomas, operative evacuation and hemostasis are indicated. Seromas should be needle aspirated¹⁰.

Superficial infection can be treated with oral anti-biotics, but if significant or if the patient becomes systemically ill, intra-venous anti-biotics are recommended in an in-patient setting. The need to debride is unusual.

Dog-ears may develop in the lateral breast area and are touched-up under local anesthesia with elliptical excision. Hypertrophic or keloid scars may need revision once the inciting etiology (tension during closure) is removed. They may also be treated with injections of triamcinolone. Lasers may be utilized. Off-label intra-lesional injections of anti-neoplastic agents such as 5-fluorouracil are also reported.

[Fig 2a Pre-op with markings. Note deep shoulder grooves. In larger breasts, the nipple must be moved more medial.]



[Fig 2b Post-Op with hypertrophic scars]



Occasionally the patient will report that she is still too large after reduction. A period of observation to allow edema to subside and for the patient to now attempt weight loss to get closer to a normal BMI (if she was over-weight to start) should be undertaken.

An undesirable yet consistent long-term outcome of inferior-pedicle and Wise pattern breast reduction is “bottoming-out” and developing a high-NAC. A vertical skin excision may address the pseudo-ptosis sufficiently. Many techniques exist to lower the NAC, including excising excess skin in the IMF but sometimes a scar above the NAC becomes necessary.

Fat necrosis should be treated conservatively initially since much of it will soften and improve. But, if after 6-9 months of massage and observation the fat necrosis is persistent, it should be excised through existing scars.

Nipple necrosis is managed conservatively until healed. Then, the nipple is reconstructed using the techniques for breast reconstruction (such as C-V flap, Key-Hole flap, etc.) and then tattooed.

[Fig 5 – unilateral loss of NAC in patient with fat necrosis throughout both breasts]



Malignancy is an uncommon finding in the breast specimen, but if found, it is discussed with the patient, pathologist, and a breast oncologic surgeon. If the malignancy is surrounded by a healthy margin of normal tissue, it can be considered an adequate lumpectomy. If not, then a mastectomy is indicated. Axillary lymph node sampling may be done via a sentinel lymph node technique. Radiation therapy would be indicated for this method of BCT.

Outcomes

Numerous meta-analyses and prospective cohort studies provide Level I and Level II evidence that breast-reduction is effective in addressing the symptoms associated with macromastia, and that there is generally high patient and physician satisfaction¹¹. In breast reduction, inferior-pedicle technique takes center stage as it is the most commonly subscribed-to technique in the United States, has a low rate of complications, is versatile yet predictable, and preserves vascularity and sensation to the nipple¹².

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