Inferior Pedicle Techniques

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15.1 Introduction

Partial breast reconstruction is occasionally required after tumor resection in women who choose breast conservation therapy (BCT) [1]. Various options exist, including rearranging breast tissue, and flap transfer. The oncoplastic reduction or mastopexy technique is very beneficial and seems to be one of the more commonly used approaches [2, 3]. Plastic surgeons are familiar with different breast reduction techniques and pedicles, and will often have preferences in terms of which technique they perform most of the time. The same applies for oncoplastic reduction techniques; however, the location of the tumor defect in addition to breast size and shape will influence the decision.

The inferior pedicle is still one of the most commonly performed breast reduction techniques since it is easy to perform, reliable, and versatile [4]. It makes sense for it to be a commonly used technique in oncoplastic reduction for defects as well, and can essentially be used to reconstruct a partial mastectomy defect in any location except purely inferior [5].

15.2 The Benefits of the Inferior Pedicle Technique

The inferior pedicle can reliably keep the nipple–areola complex well perfused in a breast of almost any size and shape. It is a technique that is easy to learn, and is reproducible. The complications are comparable to other approaches [6]. Although it does require some flap undermining and the Wise pattern in most cases, it can be performed in 2–3 h. Some feel that the inferior pedicle technique has a lower complication rate since the inferior location obliterates dead space in the dependent region of the breast.

15.3 Indications

The indications for an inferior pedicle oncoplastic reduction are women with breast cancer who wish to preserve their breasts and have moderate-sized to large breasts with ptosis. A reduced breast will tolerate radiation therapy better than a large breast, and aesthetic results have been shown to be superior. If the tumor is in the upper or medial pole and there is concern about creating an unfavorable results from a cosmetic standpoint with lumpectomy alone, then this oncoplastic approach is preferable, Other indications for an inferior pedicle oncoplastic procedure are medial, superior, or lateral tumors where the surgeon is concerned about being able to obtain negative margins and anticipates a large resection or if the tumor to breast ratio is greater than 20 %. The ideal patient is one where the tumor can be excised within the expected breast reduction specimen where sufficient breast parenchyma remains following resection to reshape the mound (Fig. 15.1).

15.4 Contraindications

The inferior oncoplastic pedicle technique typically cannot be used if the tumor defect is in the midline lower pole. If the tumor defect is slightly off midline and the inferior pedicle can be based more laterally or medially, then it can still be used for lower-pole tumors. Adequate base width is required and the pedicle cannot be detrimental to shaping the breast mound following resection. If it becomes difficult, then a more superiorly based pedicle is preferable. Central or subareolar tumors that require tumor resection directly beneath the nipple–areola complex could compromise nipple viability with a long inferior pedicle. Choosing

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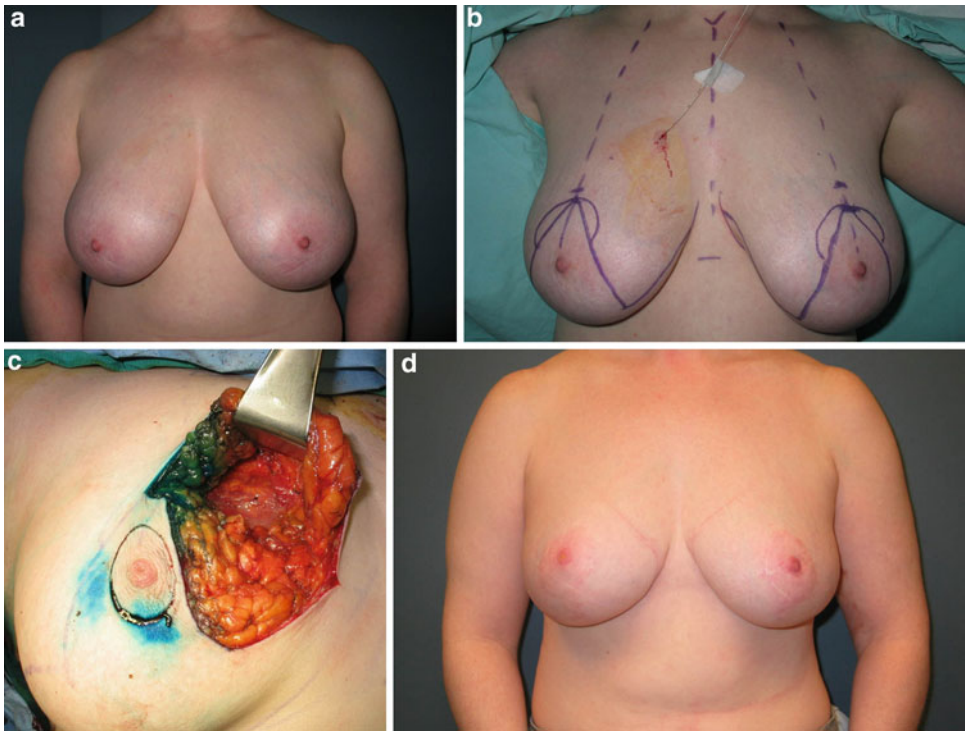

Fig. 15.1 This 33-year-old woman with stage III breast cancer had an excellent response to preoperative chemotherapy, and desired breast conservation. To minimize the potential for a poor cosmetic result with a defect in the upper pole, she underwent a right wire-guided lumpectomy (100 g) with simultaneous bilateral breast reduction (total masses 250 g left and 150 g right). The nipple was moved on the basis of an inferiorly based dermatoglandular pedicle. The pedicle filled the defect and her result is shown at 1 year following completion of radiation therapy for the right breast

a shorter pedicle or even amputation and free nipple graft is safer. Women with a previous infra-areolar biopsy scar or a tumor just inferior to the nipple are not candidates for the inferior pedicle procedure. Appropriate patient selection as always will minimize complications in patients with comorbidities and smokers.

15.5 Timing of Partial Breast Reconstruction

In general, partial breast reconstruction when indicated is best performed at the time of resection (immediate reconstruction). The main concern with immediate reconstruction is the potential for positive margins. When this concern does exist, the reconstruction can be delayed until final confirmation of negative margins (delayed–immediate reconstruction). This then allows the benefits of reconstruction prior to radiation therapy with the luxury of clear margins, although at the expense of a second procedure (Fig. 15.2). Such women at increased risk of positive margins included those under 40 years old, those with extensive ductal carcinoma in situ, those with high-grade tumors, those with a history of neoadjuvant chemotherapy, those with infiltrating lobular carcinoma, and those with human epidermal growth factor receptor 2/neu positivity [3, 7, 8]. The main disadvantage is the need for a secondary procedure, which might be unnecessary in most cases. When a flap reconstruction is required, we prefer to confirm the final margin status prior to partial breast reconstruction.

There are situations where poor results are encountered years following radiation therapy, which then require correction (delayed reconstruction). Reduction techniques should be used with caution in patients who have already been irradiated.

15.6 Surgical Technique

15.6.1 Preoperative Planning

The multidisciplinary team discusses the case and reviews the mammograms. The resective surgeon plans the tumor removal with or without radiographic guidance. The standard Wise pattern markings are then drawn preoperatively marking the nipple in the breast meridian about 19–23 cm from the sternal notch. The tumor defect location is anticipated and an inferior pedicle is drawn out. It should be about 8 cm wide in small breasts, and 10 cm or more in patients with large breasts. The location of the inferior pedicle can be adjusted either medially or laterally to maximize width and blood flow depending on the tumor location and degree of breast ptosis. A similar pattern is drawn on the contralateral breast for symmetry.

15.6.2 Resection

The breast surgeon then performs the tumor resection, ideally below or through the Wise pattern markings and not through the base of the inferior pedicle. If this approach is

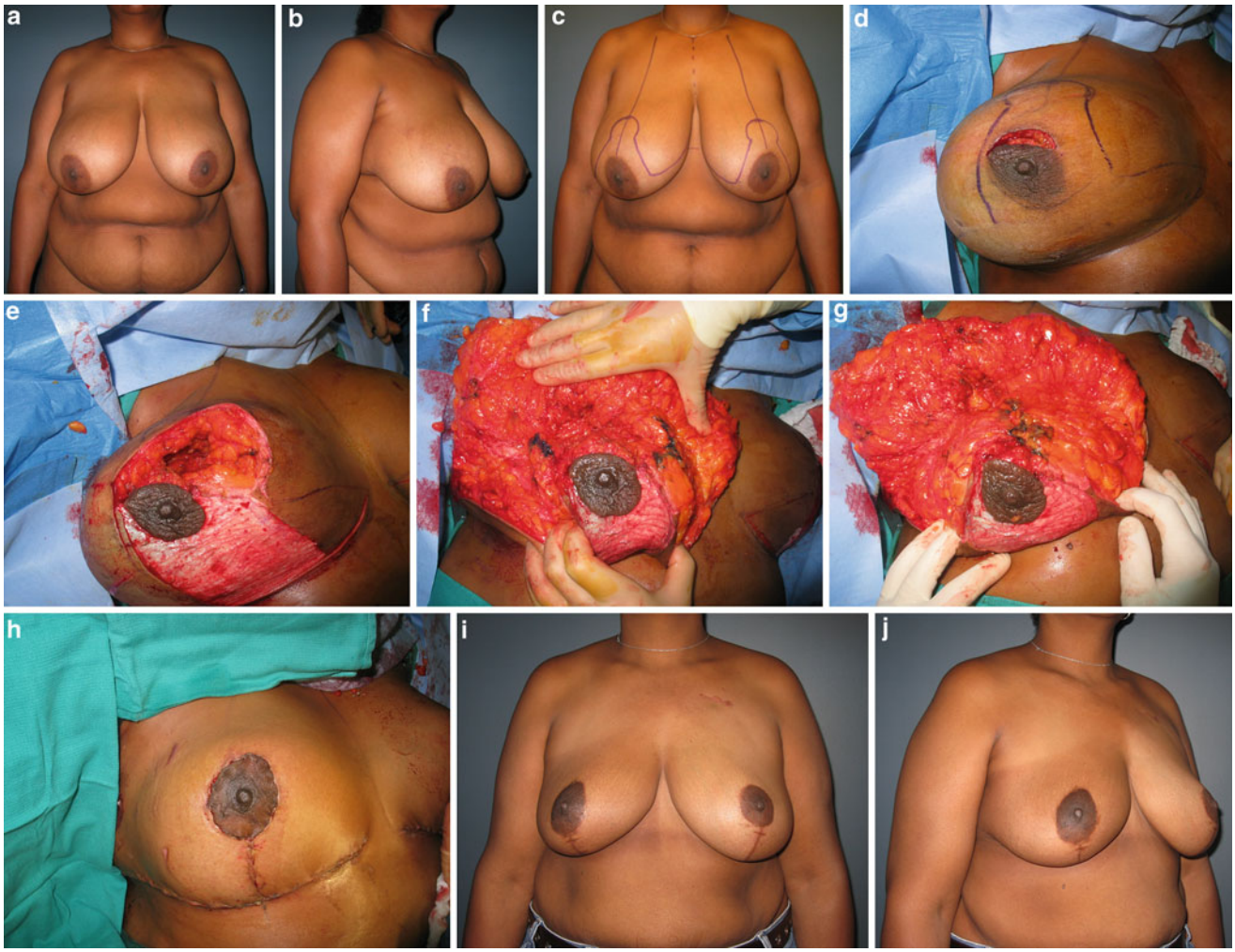

Fig. 15.2 This 49-year-old woman with macromastia had a resection above the nipple–areola complex. Her defect was reconstructed using an inferior pedicle breast reduction. Since there is little tissue on the pedicle above the nipple–areola complex to fill the dead space, the glandular tissue is plicated above the nipple for upper-pole volume. She is shown 1 year following completion of radiation therapy [11]

required for tumor resection, then an alternative pedicle design is required. Skin can be resected along with the tumor if desired as long as it is within the proposed area of dermatoglandular resection. It is important for the reconstructive surgeon to be present at the resection until a comfortable working relationship is achieved. Following tumor resection and intraoperative margin assessment, the cavity is clipped for postoperative surveillance and radiation boosting. The tumor specimen is weighed.

15.6.3 Reconstruction

The remaining breast tissue is examined. The goals are to [1] keep the nipple alive, [2] fill the dead space, and [3] reconstruct or reshape the breast mound. The nipple is incised at the appropriate diameter. The standard Wise pattern is cut if this has not already been done. An inferior pedicle is then deepithelialized. The dermatoglandular pedicle is then created with a wide enough base to maintain nipple viability. Tissue above the nipple–areola complex is also deepithelialized and preserved especially in upper-pole tumors, where the pedicle might be required to fill a defect above the proposed new nipple position. The next step is to fill the dead space (tumor defect). Additional tissue should not be resected until it has been determined that the dead space can be filled with r the inferior pedicle, surrounding breast tissue, or breast flaps. Parenchyma can always be plicated above the nipple if there is need to fill a dead space (Fig. 15.2). Once this has been achieved, the additional dermatoglandular tissue can be resected in the usual reduction fashion, and weighed. The breast mound is then shaped, skin flaps are closed, and the nipple–areola complex is inset. Drains are placed in the tumor cavity. The contralateral reduction is then performed using the same inferior pedicle technique. Ideally, the contralateral

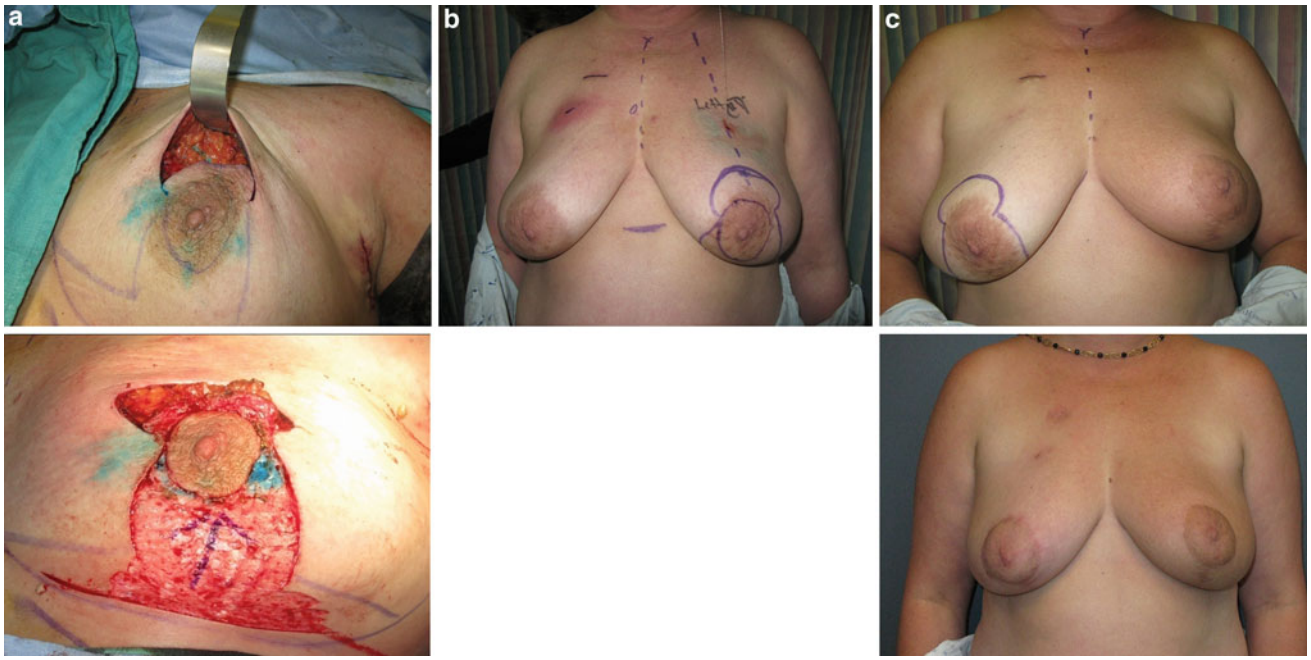

Fig. 15.3 This demonstrates an upper-pole breast cancer resected with a wire-guided biopsy leaving a defect above the nipple. A standard inferior pedicle Wise pattern oncoplastic reduction was chosen at the time of lumpectomy. The right reduction was deferred owing to an infectious process in that breast. The contralateral breast reduction was delayed until completion of radiation therapy (6 months later). There is reasonable shape and symmetry at 1 year following completion of radiation therapy

breast is reduced about 10 % more than the breast with the tumor in anticipation of radiation fibrosis. This will maximize symmetry following completion of radiation therapy. Specimens are then sent separately to the pathology department. Another option with the contralateral breast is to perform the reduction following completion of radiation therapy; however, this approach will necessitate a second procedure in almost everyone (Fig. 15.3).

The inferior pedicle can be adjusted depending on the tumor location (Fig. 15.4) [5]. The medial wedge of parenchyma can be included in the pedicle as an inferomedial design to both enhance blood flow to the nipple and provide additional bulk to fill an upper inner-quadrant defect (Fig. 15.5). An inferolateral pedicle can also be used for lower inner-quadrant defects.

15.7 Surveillance

The three main tools when it comes to postoperative surveillance are the physical examination, radiologic imaging, and tissue sampling. It is important that all members of the team are aware of the various surgical components, since differences in presentation might exist. We have demonstrated that mammography following partial breast reconstruction using reduction techniques is just as sensitive as a screening tool as for patients with BCT alone [9]. Although the qualitative mammographic findings were similar in the two groups over the average 6-year follow-up, there was a slight trend towards longer times to mammographic stability in the oncoplastic reduction group (25.6 vs. 21.2 months in the group with BCT alone). This means that it might take oncoplastic reduction patients slightly longer to reach the point where any change in mammographic findings might be suggestive of malignancy. An accurate interpretation requires familiarity with these temporal changes, and mammograms should be compared over time. Microcalcifications and areas of fat necrosis are easily identified, and no interference in postoperative surveillance has been demonstrated. Other imaging techniques such as ultrasonography and MRI will likely become more popular as technology improves. Although routine tissue sampling is not recommended for screening, any clinical concern necessitates fine-needle aspiration, core-needle biopsy, or surgical biopsy to rule out malignancy. Patients who undergo partial breast reconstruction are expected to have an increase in the amount of tissue sampling required, as demonstrated in our series (53 % in the oncoplastic group compared with 18 % in the group with BCT alone over an average of 7 years).

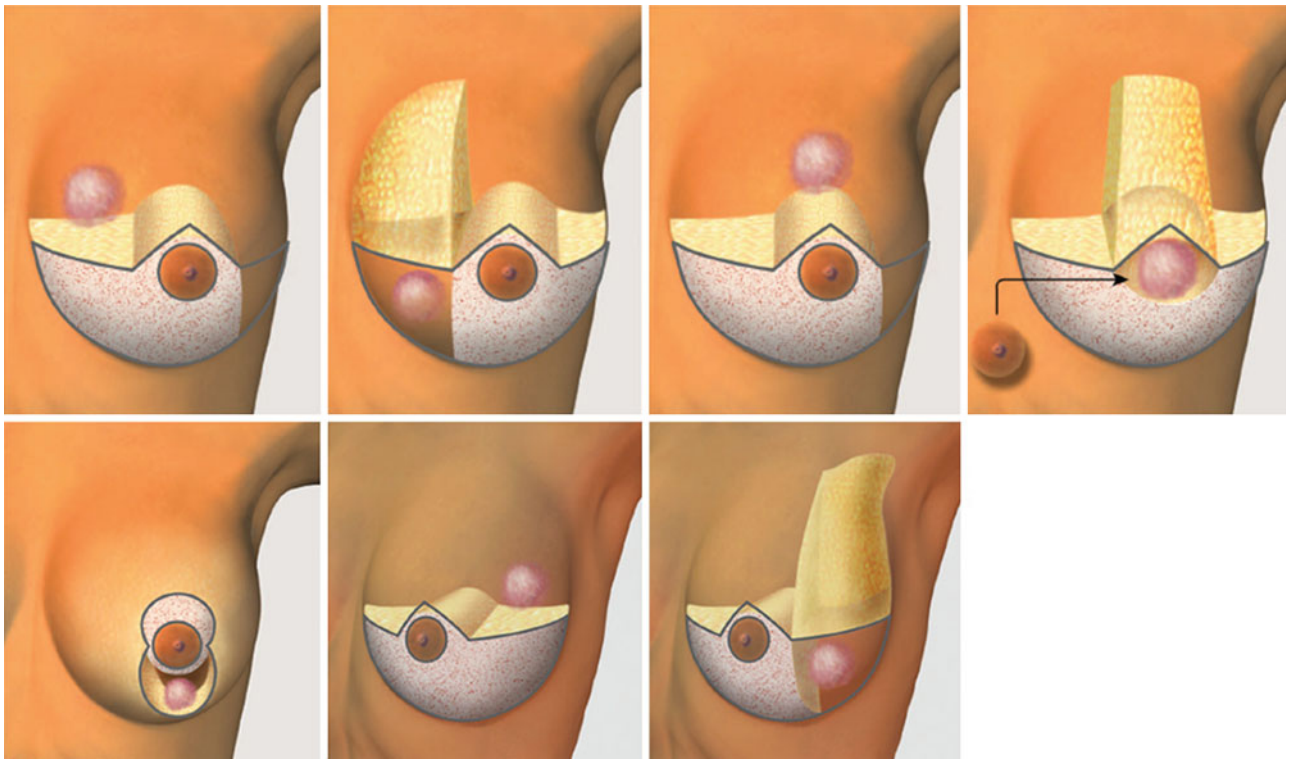

Fig. 15.4 The various modifications to the inferior pedicle based on tumor location [5]

Fig. 15.5 Intraoperative demonstration of retained medial wedge to the inferior pedicle used to fill an inner-quadrant defect following wide excision

15.8 Complications and Outcomes

The inferior pedicle reduction pattern is relatively safe and effective; however, complications can occur. Careful patient selection will minimize the incidence of postoperative complications. Some larger series with volume displacement techniques using a variety of reduction techniques report complications such as delayed wound healing (3–15 %), fat necrosis (3–10 %), and infection (1–5 %) [2, 3, 5]. Loss of nipple is very rare when the pedicle is wide enough and the technique is well designed and executed. Delayed complications with the oncoplastic approach include breast fibrosis and asymmetry. Although the goal of partial breast reconstruction is to prevent the unfavorable cosmetic result, this approach cannot prevent or reverse the effects of radiation therapy. Since these effects will persist, the assessment of shape and symmetry needs to be made in the context of the long term. However, with partial reconstruction, shape is typically preserved and it is easier to adjust the contralateral side secondarily if necessary than reconstruct an irradiated BCT deformity. Asgeirsson et al. [10] reviewed numerous series with intermediate follow-up and demonstrated cosmetic failure rates of 0–18 %. Local recurrence is another important outcome that needs to be evaluated in the oncoplastic patient. Most reviews in the literature are of intermediate follow-up (up to 4.5 years), with local recurrence rates ranging from 0 to 1.8 % per year [10]. Actuarial 5-year local recurrence rates range from 8.5 to 9.4 %. Longer-term studies are required.

15.9 Conclusion

Inferior pedicle oncoplastic reduction is a very reliable and versatile technique for reconstructing the partial mastectomy defects in women with macromastia or ptosis. This technique can be used in a breast of almost any size or shape, as long as sufficient tissue remains following tumor resection. The inferior pedicle oncoplastic reduction technique is indicated for any tumor location except purely inferior. Complication rates and aesthetic results are favorable, and this approach does not interfere with cancer surveillance. We need to critically evaluate results measuring functional, oncological, and aesthetic outcomes in an attempt to establish safe and effective practice guidelines to maximize outcomes.

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