

# 9

## Mastectomy

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### Introduction

Performing a mastectomy can be accomplished using a wide variety of techniques, depending on the clinical setting. Any mastectomy should be sensitive to the aims and principles of oncoplastic breast surgery, namely that optimal treatment of the malignancy should be achieved with minimal impact on quality of life. Training in oncoplastic surgery often starts with the 'simple' procedure of mastectomy (and of course, an understanding of the options a woman has to avoid it if she wishes to do so). However, the fact is that mastectomy should not be regarded as simple. From a surgical perspective, there are many ways to perform it and many ways to mitigate the psychological and physical effect of breast loss. Performing a mastectomy well requires thoughtful planning, careful tissue handling and a degree of artistry. Performed incorrectly, a mastectomy can be an ugly reminder of endured treatment, a common cause of complication or reconstruction failure, or a cause of disease recurrence.

### Completeness of mastectomy

A mastectomy aims to remove as much breast tissue as is possible. In addition, it aims to achieve clearance of any malignancy. For locally advanced disease, the latter aim may require a mastectomy to include overlying skin or adjacent structures local to the disease, but in most cases, these structures can be preserved. As most mastectomies are performed for extensive disease not suitable for breast conservation, or for risk reduction, every effort

should be made to ensure as complete a mastectomy as possible. However, it has long been recognised that almost all mastectomies will leave some breast tissue behind. This is true no matter how thin the mastectomy flaps are. In one study on cadavers, even when the skin flaps were made so thin that they resembled 'full-thickness skin grafts', residual breast tissue was found in 83% of specimens; on the pectoral muscle, periphery of the resection and on the overlying skin flaps.<sup>1</sup>

In terms of oncological outcomes, there are two consequences of 'incomplete' removal of all breast tissue. One is leaving residual breast tissue that may subsequently undergo malignant change, and as a consequence all women undergoing risk-reducing surgery should be counselled that there will be a small but real risk of breast cancer even after this procedure. The other is positive margins on histology for existing malignant disease. This has been shown to be associated with an increased risk of local recurrence but only significantly so in those who did not have radiotherapy or those with inflammatory breast cancer.<sup>2</sup>

Usually, a mastectomy can be performed whilst leaving as much of the overlying subcutaneous tissue and skin as is desired for aesthetic purposes. The subcutaneous layer is the conduit for the vasculature supplying the skin after a mastectomy and preserving it, therefore it reduces the risk of ischaemic complications and increases the quality of the tissue left resurfacing the chest or forming part of a breast reconstruction. This layer is of variable and unpredictable thickness and studies have shown that a distinct layer of fascia separating the breast tissue and breast fat from the subcutaneous layer of fat is evident

in only half of cases, and inconsistent in the majority.<sup>3</sup> This ‘plane’ of mastectomy needs to be individually tailored as it will be thicker in some women and thinner in others and is usually thicker towards the periphery of the breast. There are different techniques for deciding upon the plane of dissection as described below but essentially this component of the mastectomy procedure is very surgeon-dependent and there is no set thickness of mastectomy flaps that defines a properly performed mastectomy.<sup>4,5</sup>

In planning a mastectomy, the first question to answer is: What do I need to remove to achieve the aims of this operation? For instance, if the cancer is very close to overlying skin then plan to remove the overlying skin, and if the plan is to leave the skin over the cancer then the surgeon may err on leaving the subcutaneous layer thinner over such areas of disease. Thus, the ‘radical’ element of this operation is tailored to the patient and their disease. Striving for a ‘complete’ mastectomy by globally making the mastectomy flaps as thin as possible is not only futile, it risks leaving skin and subcutaneous fat that is non-viable or severely compromised.

## General considerations in planning a mastectomy

✓ Initial considerations in planning a mastectomy should include the following:

- Reconstruction options should be discussed with all women having a mastectomy. There is no absolute contraindication to immediate breast reconstruction, only relative contraindications.
- Mastectomy technique will vary according to whether a reconstruction is being performed or not and according to type of reconstruction.
- The exact technique of mastectomy needs to be individually tailored to the oncological indications for it, body habitus and breast form.
- Women who choose not to have reconstruction should still have an aesthetic operation leaving a neat scar, contoured chest and comfortable base for an external prosthesis and bra fitting.
- A mastectomy is a radical cancer operation and is usually performed because no good option for breast conservation exists, or for risk-reduction. It should not compromise on its aim of achieving good local disease control.
- No mastectomy is 100% complete. This should be accepted and the boundaries of the breast should be respected and only transgressed where disease is very near and this is necessary to ensure complete disease clearance, or for aesthetic reasons.

The blood supply to the breast and the tissues overlying it is derived mainly from the internal mammary perforators (particularly the second), the lateral thoracic artery and the intercostal perforators.<sup>6</sup> As a mastectomy removes most of the intercostal perforators and the mammary branch of the lateral thoracic artery, the vascularity to the overlying breast skin and subcutaneous tissue is compromised in all forms of mastectomy. As such, patient risk factors that further affect vascularity or wound healing become important cofactors in complications. These include:

- smoking;
- obesity;
- diabetes;
- poor skin quality;
- previous radiotherapy;
- previous surgery to the breast;
- severe comorbidities.

Of these, smoking is the most commonly encountered factor that can be improved to optimise outcome within the timescale of the urgent case. This and other factors may affect technique selection.

## Smoking

There are more than 4000 chemicals present in cigarette smoke, including nicotine and carbon monoxide.<sup>7</sup> One effect of nicotine is to cause vasoconstriction of the dermal–subcutaneous vascular plexus. This has important consequences as mastectomy flaps rely on this plexus for survival.<sup>8</sup> As well as inducing a hypoxic state and causing vasoconstriction, smoking can lead to increased platelet aggregation, which results in the formation of tiny thromboses in capillaries. This is detrimental to wound healing, which relies heavily on blood flow in newly formed capillaries. Smokers have higher levels of fibrinogen and haemoglobin, which increase blood viscosity, which further increases the likelihood of blood clotting, and blood velocity can be reduced by up to 42% in smokers.<sup>9</sup> The combination of decreased oxygen delivery to tissues and the thrombogenic effects of smoking, together with increased viscosity and reduced velocity, explain why wound healing in smokers is significantly impaired.

One study of 425 patients undergoing mastectomy and breast-conserving surgery identified smoking as an independent predictor for wound infection and skin necrosis regardless of the number of cigarettes smoked.<sup>10</sup> Another study of 716 patients having free transverse rectus abdominis myocutaneous (TRAM) flaps showed mastectomy flap necrosis,

abdominal flap necrosis and abdominal hernias were significantly higher in smokers.<sup>11</sup> This study did demonstrate a dose effect, with smokers who had a history of more than a pack a day for 10 years being at increased risk of developing problems compared with smokers who had smoked for a smaller number of pack-years (55.8% vs 23.8%). One observation in this study was that delayed breast reconstruction in smokers was associated with a significantly lower rate of wound complications compared with immediate breast reconstruction. The risk of wound complications in delayed reconstructions in smokers was similar to the rate in non-smokers. Complications were also less common in women who stopped smoking 4 or more weeks before surgery.

There was one small randomised clinical trial with 40 patients in the control group and 68 patients in the interventional group investigating smoking cessation prior to surgery.<sup>12</sup> Patients assigned to intervention were given counselling and nicotine replacement therapy, and did not smoke for 10 days after the operation. This study showed a significant reduction in complications in the intervention group, with a reduction in both wound-related complications and the need for secondary surgery. In the literature, there is no consensus on the optimal duration of preoperative smoking cessation but there is evidence from a variety of studies that there are potential benefits from even a brief period of abstinence.

## Considerations for simple mastectomy

In addition to general considerations, four questions should be answered:

1. Is it necessary/desirable to excise skin overlying the cancer?

In principle, skin only requires to be excised if the cancer is involving the skin or is so close that a clear margin cannot clearly be achieved around the cancer without skin resection. If these criteria are met or are uncertain then mastectomy is an excellent opportunity to remove skin over a cancer and should be planned accordingly.

2. Is there likely to be a lateral 'dog ear'/redundant tissue?

The all too frequently seen but completely avoidable complication of mastectomy is redundant tissue, also known as a dog ear, which is unsightly, causes difficulty with bra fitting and often chafes on the prosthesis, arm or bra (Fig. 9.1).

3. Would the patient benefit from a contralateral breast reduction?

This is a simple and very effective option to enable women with a heavy breast to wear a lighter prosthesis and feel less unbalanced (Fig. 9.2a). If considered desirable, then it should be performed



Figure 9.1 • Poor result from mastectomy.

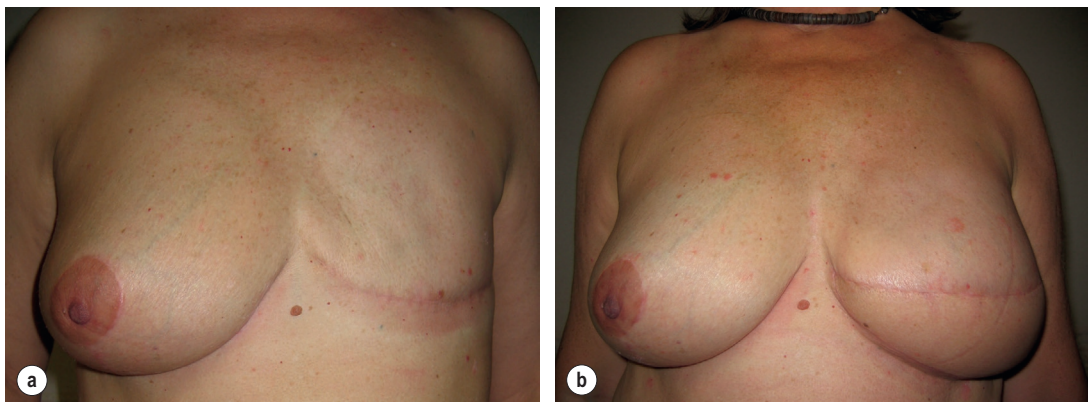


Figure 9.2 • (a) A low mastectomy scar with contralateral reduction. (b) Delayed reconstruction with LD flap and implant.

at the same time as the mastectomy. In rare cases a woman may choose a bilateral simple mastectomy to achieve better overall symmetry, although this may cause problems with bra fitting as there is no anchor for the bra or for external prostheses and such cases need careful consideration. In men, contralateral liposuction can aid postoperative symmetry in many cases.

#### 4. Is a delayed breast reconstruction planned?

The scar should be sympathetic to the method of delayed reconstruction planned. In most cases a low scar is best (as in Fig. 9.2a). A flap-based reconstruction is the most common type of delayed breast reconstruction and it allows this to be inset at the inframammary fold, with the upper scar low enough to be hidden in low neckline clothes (Fig. 9.2b).

## Planning a simple mastectomy

- Examine the patient sitting up to assess lateral tissue and plan the likely lateral end of scar. The predicted lateral extent of the incision can be marked.
- The extent of the scar is important if radiotherapy is planned as the whole scar will usually be covered and can result in large volumes of tissue being treated if the scar extends a long distance posteriorly. Consider deploying clips intraoperatively to assist with radiotherapy planning.
- Mark any skin that needs to be removed over the cancer.

## Technique

Techniques of mastectomy are largely non-evidence-based. A few small studies exist but much of what is described in this chapter is based on reports of case series, expert opinion and personal preference. It is not intended to be prescriptive or dogmatic but merely a description of an approach to a commonly performed operation. Most scars can be based around the inframammary fold (IMF). The incision pattern is drawn in theatre initially with a line at or just below the IMF (in women with any intertrigo the scar can usually be placed below this). Then with repeated upward and downward movement of the breast the planned transposition of this line on the breast skin can be marked (Fig. 9.3). In most cases the upper incision line passes a little above the areola. Attention should be paid to the degree of tension applied to the upward or downward breast movement as this represents the tension

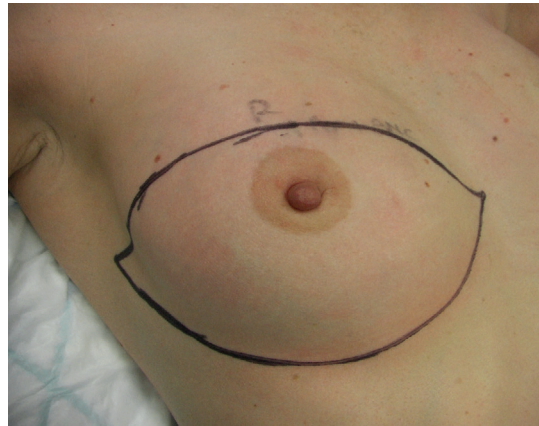


Figure 9.3 • Drawing of IMF-based incision.

that will be exerted on the wound on closure. The upper and lower incision lines should be planned so that they meet comfortably but without excess laxity. Incisions should be planned to avoid any dog ear. To achieve this, it is often best to continue the incision along the bra line laterally, curving up slightly towards the posterior axillary fold, until the upper and lower lines meet (Fig. 9.4) or, if there is doubt about how to fashion the lateral end, stop the incision at the lateral edge of the breast and fashion it once the mastectomy is complete, before closure (see comments regarding dog ear below). Transverse mastectomy scars centred on the nipple rarely, if ever, can be closed without significant excess of tissue, particularly laterally; they sit high on the chest, often show in the cleavage, and represent an outmoded approach to simple mastectomy. It is beholden on all surgeons to be familiar with a range of mastectomy incisions and given that there are always better alternatives, transverse mastectomy scars should be avoided.



Figure 9.4 • IMF-based incision with lateral extension.



Inferior broad-based flaps can be designed to allow skin excisions in the upper pole. In breasts with a high nipple position or in cases where skin excision in the upper pole is desired, the lower incision line can be adjusted upwards to preserve skin on the lower flap. Such modifications to the inferior skin flap should be broad based. Other scar patterns to consider in such situations include the Wise pattern or dome-shaped scar (Fig. 9.5).

For more locally advanced disease, the area of skin that is to be removed may be extensive. Again, it is better to first mark this out and then plan how the scar can be fashioned to allow closure. Creativity is required but skin can usually be recruited by upper abdominal advancement and sometimes lateral chest wall tissue can be useful either as a random lateral thoracic flap or a LICAP (lateral intercostal artery perforators) flap (see Radical Mastectomy below).

### Managing the potential dog ear

Several techniques have been described for this. The first and most important is to avoid incisions that are very prone to it – such as a transverse mastectomy scar, which produces a ‘dog ear’ or ‘angel wings’ in most patients in whom it is used. One approach to reduce ‘dog ears’ is as follows. If the patient is thin, a flat lateral chest wall can be achieved by using an IMF scar as described above. In women with excess lateral tissue, it is often useful to complete the mastectomy with minimal extension of the scar laterally and then tidy this part of the scar. The easiest way to do this is to close the skin with temporary placement of skin staples. This then allows variations of lateral scar closure to be visualised before commitment to any particular one. The staples can be removed and replaced as many times as necessary to get the best and shortest scar. Final wound closure is with two layers of absorbable deep and superficial subcuticular absorbable

sutures. Some lateral laxity can be accommodated by gathering the upper flap.

The three most useful techniques for lateral scar design in the author’s experience are lateral extensions of the IMF scar (towards the posterior axillary fold), liposuction and, occasionally, the fishtail technique (Fig. 9.6). When performing fishtailing, use staples to approximate the wound edges and take the lateral end of the transverse incision and staple it medially to flatten out the lateral end of the wound to leave two smaller dog ears. Mark out incisions to excise these dog ears and then excise or de-epithelialise these (to preserve blood supply at the ‘T’ where the three wounds meet) to produce the fishtail pattern. To ensure that the wound is flat, liposuction is often needed. Liposuction of lateral and medial excess subcutaneous tissue is a very useful and simple adjunctive technique in many mastectomies. The technique is simple to learn, safe and requires little equipment.

Cases in which difficulty with the lateral tissue is predicted preoperatively can be performed either with the patient on their side (ideally) or with some degree of rotation. Women with a large excess of lateral tissue can be challenging cases, and should be managed by those familiar with a range of flap-based surgery as well as with experience using liposuction, and be planned preoperatively. Glue provides a dressing that does not need to be changed, is waterproof (so patients can shower next day) and rarely produces skin reaction, so minimising further trauma to the skin surface around the flap edges.

### Goldilocks mastectomy

Although it has been tradition to excise excess skin over the breast during a mastectomy to leave a flat chest wall, other options may very occasionally be considered. Skin that would normally be discarded may be de-epithelialised, shaped and buried to improve



**Figure 9.5** • Dome-type mastectomy scar to allow excision of upper pole skin.



**Figure 9.6** • Fishtail scar with contralateral reduction (correction of case in Fig. 9.1).

the cosmetic result. This may avoid the concave appearance that often results from mastectomy and in some cases, can produce a small breast mound. Skin incisions are marked as normal but the skin between the upper and lower incisions is de-epithelialised. The de-epithelialised lower flap is then buried under the upper mastectomy flap. In large breasts a Wise pattern mastectomy can allow a large de-epithelialised inferiorly based flap. The amount of tissue that can be preserved and used in this way will vary considerably, depending on risk factors for tissue viability and the amount of skin required to be removed for oncological reasons. Lateral chest wall tissue can usually be recruited to add volume in the form of a LICAP flap. Care is required in wound closure to maintain the superficial vasculature (Fig. 9.7).

### Bilateral simple mastectomy

Ideally these should be symmetrical. Bilateral IMF-based scars work well. It is important to leave a skin bridge in the midline and not have a continuous scar across the chest, which tends to contract along its length. A small amount of liposuction in the midline, between the scars, can prevent medial 'dog ears'.

### Undesirable scar patterns

High transverse and most diagonal scars should be historical other than in salvage situations. Likewise any scar that does not leave a flat surface with a contoured lateral chest wall should be avoided. In general, transverse scars rarely leave a satisfactory result and are not recommended.

## Radical mastectomy

This still has a role to control locally advanced disease. Formal removal of all the pectoralis major muscle is, however, rarely required and partial excision removing the area of muscle involved with a margin of surrounding normal muscle is usually sufficient. If disease is involving muscle clinically,



**Figure 9.7** • Bilateral Goldilocks mastectomy.

then excision margins should be generous. In escalating order, the following options for wound closure should be considered:

- abdominal advancement flap;
- lateral chest wall perforator flap;
- split-skin graft;
- latissimus dorsi (LD) flap (muscle-sparing or full myocutaneous);
- deep inferior epigastric perforator/transverse rectus abdominis myocutaneous flap;
- omental flap.

All have a potential role depending on the size of defect, patient fitness and suitability of donor sites.

## Considerations for mastectomy with immediate reconstruction

Of the general considerations listed above, smoking is a particular concern and the major risk factor for flap necrosis and wound problems after skin-sparing mastectomy.<sup>13</sup> Most studies have found that neoadjuvant chemotherapy is not associated with an increased risk of complications.<sup>14,15</sup>

The following questions should be considered:

1. Is it necessary/desirable to excise skin overlying the cancer?

In general terms, the same principles apply as described above. However, immediate breast reconstruction is enhanced by preserving most (if not all) of the breast skin. Studies assessing the safety of this procedure have shown rates of local recurrence that are similar to standard mastectomy incisions although no large randomised trial data are available. It seems sensible to apply the same principles as one would for simple mastectomy. In other words, if the cancer is close to skin such that a healthy margin of normal tissue cannot easily be excised around it, then the overlying skin should be resected. An important principle of oncoplastic surgery is that treatment must not be compromised for the sake of cosmesis. Different designs of skin-sparing mastectomy can allow skin excisions at any site.

2. Is overall reduction or augmentation planned?

This will obviously influence the scar pattern and position to facilitate overall adjustment in breast size and obtain optimal symmetry.

3. What scar design will give the optimum balance of access and aesthetic result?

Access to perform the mastectomy adequately cannot be compromised. Minimal access mastectomy is possible but is more technically challenging and

requires training in the techniques to achieve it. Familiarity with a range of different options will enable the best outcome. In this regard, one additional question could be: Am I the best surgeon to be performing the type of mastectomy that is required in this case? Designs will vary according to method of reconstruction, as described below.

#### 4. Is the nipple–areola complex to be excised?

Preserving the nipple is increasingly considered an option for all women who require or choose a mastectomy.<sup>16</sup> Various approaches to mastectomy allow nipple preservation for any woman undergoing a mastectomy where the nipple does not need to be removed for oncological reasons. However, scars, techniques and the ease with which nipples can be preserved vary greatly (see below).

## Planning a mastectomy with reconstruction

Examine and mark up with the patient standing. Different techniques are best described according to whether tissue-based or implant-based reconstruction is being performed. As a general principle, tissue-based reconstruction requires more access but will always be more forgiving of mastectomy-related complications than implant-based.

### Tissue-based reconstruction

#### Circumareolar

This is perhaps the most commonly employed technique. It gives excellent access to all but very large breasts. It can be extended easily by a lateral or inferior extension or by widening the circular skin excision. The resulting defect is replaced with skin from the flap, often with nipple reconstruction at the same time (Fig. 9.8).



**Figure 9.8** • Left circumareolar mastectomy with immediate LD flap and nipple reconstruction.

### Wise pattern

This is another commonly employed technique that can be used for any ptotic breast. The design is more conservative than would be used for a standard breast reduction, and is often best planned as very conservative, with adjustment of the vertical limbs at the time of closure according to viability and tension. A vulnerable part of this design is the lateral part of the inverted 'T'. In one study the rate of mastectomy flap necrosis was significantly greater in patients undergoing inverted-T mastectomy compared to a horizontal ellipse (25.6% vs 11.0 %), although rates were very high in both.<sup>17</sup> A recent modification is to de-epithelialise the lower mastectomy flap, as for a 'Goldilocks' mastectomy, so the vulnerable part of the T incision is placed directly over the de-epithelialised lower flap of the mastectomy scar. With division of the lateral thoracic vessels as part of the mastectomy, this often ends up as the most ischaemic part of the mastectomy flap. Designing an inverted 'V' component to the lower incision that will release tension at the 'T' junction is often prudent (Fig. 9.9). Preservation of a larger section of lower flap skin until the time of closure enables the option of wider skin excision if viability is a concern or, as outlined above, de-epithelialisation and double-breasting of the scar.

### Dome

This allows an aesthetic excision of a breast of variable size. It also allows any subsequent myocutaneous flap for breast reconstruction to be inserted directly into the IMF. It is a very 'safe' design for higher-risk cases.

### Lower vertical

This incision gives excellent access and can be extended vertically upwards through the nipple if required. It is our preferred incision for nipple-sparing mastectomy and flap reconstruction.

## Implant reconstruction

### Nipple-sparing mastectomy

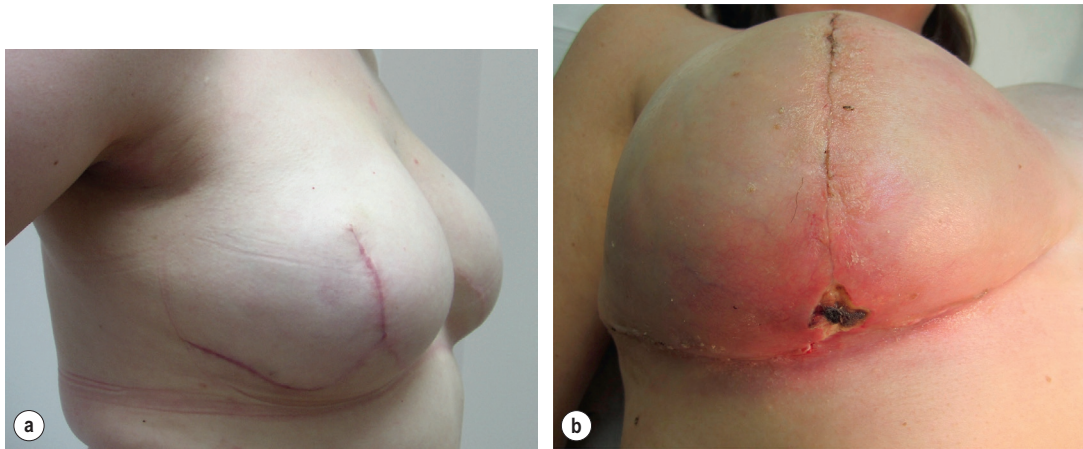
#### Inframammary fold (IMF)

This is a more technically demanding approach, but a scar based on the outer half/middle third of the IMF is the preferred incision for one-stage implant reconstruction with subcutaneous mastectomy. Creating a small inferior adipofascial flap below the incision allows a good double-layer closure (Fig. 9.10).

#### Lower vertical

This is a good option for those with minor or pseudoptosis in which case a small vertical ellipse can be taken and de-epithelialised to allow a double-layer closure. This scar encourages nipple elevation in those for whom the nipple position is initially slightly low. This can sometimes be combined with





**Figure 9.9** • (a) Preservation of inverted 'V' on lower flap in Wise pattern mastectomy with implant reconstruction. (b) T-junction necrosis. This is not uncommon in Wise pattern mastectomies.



**Figure 9.10** • Planning and outcome of inframammary fold mastectomy and direct to implant reconstruction. (a) Patient before operation showing site of two cancers in upper outer quadrant. (b) Lateral view after mastectomy showing symmetry and scar of sentinel node biopsy. (c) Well-healed inframammary scar can be seen. (d) Anterior view after surgery showing good symmetry but with minor dimpling over the implant superomedially that can be improved with later lipofilling.



a de-epithelialised small vertical mastopexy scar to allow repositioning of the nipple/areola.

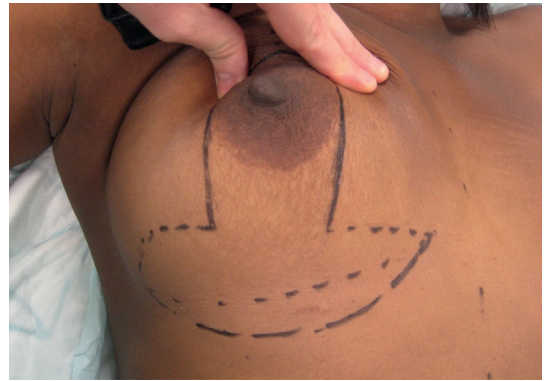
*Lateral lazy 'S'*

This is another safe incision although this can retract the nipple laterally.

**Skin-sparing (removing nipple)**

*Wise pattern*

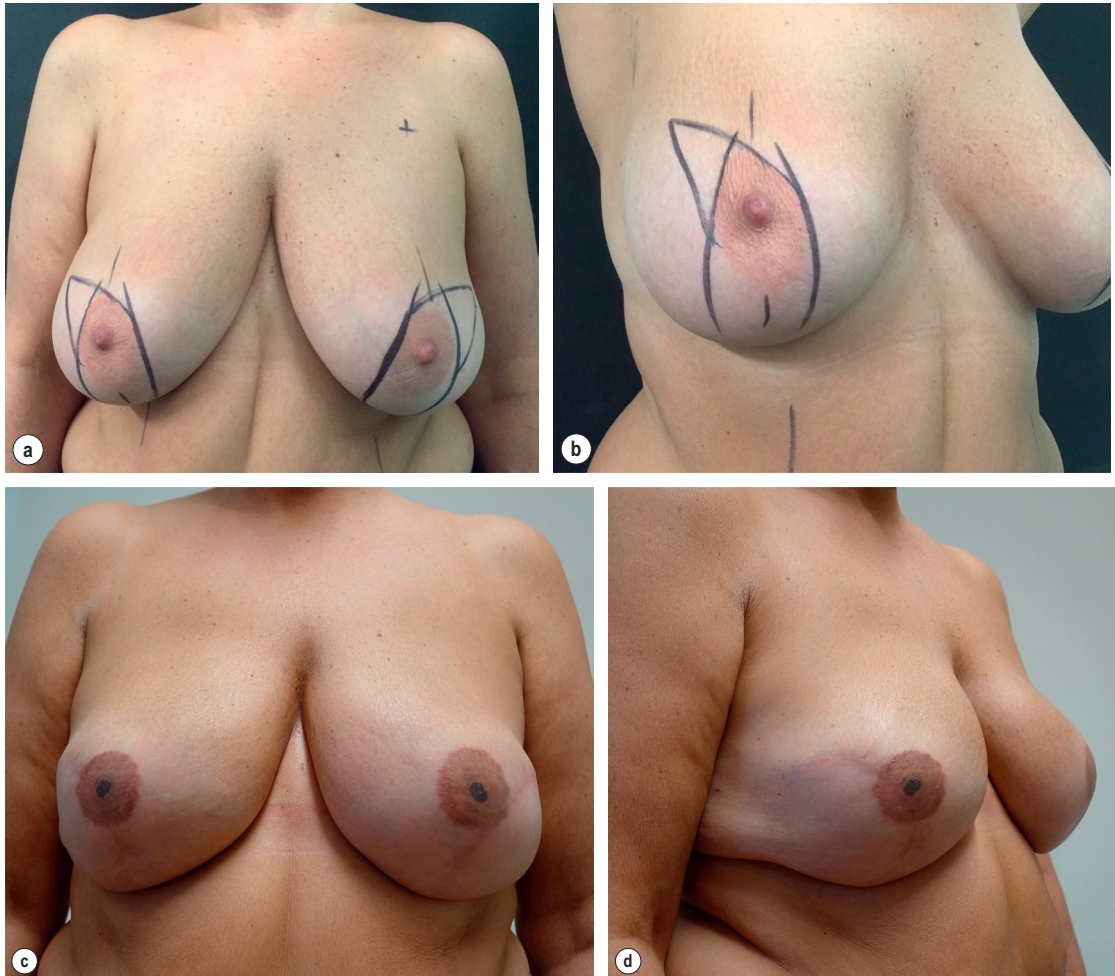
This is a good option for the large breast, although if not planned carefully wound healing at the T junction can be a problem. It gives excellent access to the breast. (Fig. 9.11). A de-epithelialised lower flap can also be combined with the use of a dermal matrix or mesh for breast reconstruction and can provide cover of the dermal matrix or mesh, particularly in the vulnerable T-junction area where the scars meet. Leaving an inverted V flap based on the IMF and lower pole breast skin is recommended and can make this even safer.



**Figure 9.11** • Drawing of a Wise pattern mastectomy.

*Transvertical*

This is an easy and probably safer option for a large ptotic breast. Skin reduction is achieved by combining vertical and lateral horizontal/oblique ellipses (Fig. 9.12).



**Figure 9.12** • Planning and outcome of bilateral transvertical mastectomy and pre-pectoral implant reconstruction. (a, b) Preoperative photos. (c, d) Postoperative photos.

### Short transverse

This is sometimes a good option in a modest-sized breast when a patient has a small areola that can be excised as a circumareolar incision but closed transversely.

### Using a second incision for sentinel lymph node biopsy

This may be prudent, particularly with performing an IMF mastectomy to limit the degree of skin flap retraction and is valuable for vascular pedicle and tendon access when using an LD flap reconstruction.

### Undesirable scar patterns

- Periareolar: this allows very restricted and, in the author's opinion, difficult access to the breast in all but very small breasts and compromises nipple blood supply.
- Any long transverse/oblique scar: these have no role in immediate reconstruction.
- Purse-string: this creates ischaemia at the skin edge, can result in a central sinus, stretches to produce an unsightly scar, and results in a scar that presents difficulties for nipple reconstruction and tattooing.

## Technique

### Preoperative marking

Mark with the patient standing. Circumareolar incisions can be marked pre- or intraoperatively. In women with a large areola, some areola can be preserved. For Wise and vertical patterns, the breast meridian is drawn and patients marked up as for a reduction or mastopexy but with more conservative vertical incision lines (see Fig. 9.11). In Wise pattern mastectomy, the vertical components are usually 10 cm in length from apex to horizontal incision. They often hug the areola margin. They can always be trimmed if necessary on closure and the 'T' junction modified as described above. Mark an inverted 'V' on the inferior horizontal scar at the breast meridian. Dome-shaped incisions are based on the IMF. The base width can be varied. The apex of the dome is on the breast meridian and can be extended to the required height. IMF incisions start medially at a line drawn vertically from the medial edge of the areola and extend laterally along the IMF/lateral breast curvature (usually 6–8 cm).

In a similar fashion to simple mastectomy, the plane is often best identified using opposing traction on the wound before skin hooks or similar retractors are applied. For incisions where access is limited (such as the IMF), hydrodissection with a dilute adrenaline/saline solution (1 in 500 000) injected using a blunt

infiltration cannula attached to a 50-mL syringe is very useful. Approximately 100–200 mL of fluid is evenly injected depending on breast size. Placing this fluid accurately is important as it will determine the plane of dissection. Dissection is then performed with half-open scissors, the sensation being 'over the breast', rather than 'under the skin'. This is quick, usually bloodless and avoids excess retraction. Once the subcutaneous plane is dissected, the submammary plane is dissected with cautery. The peripheral attachments can then be dissected under direct vision, preserving the medial perforators. If access is felt to be compromising the dissection, then the incision should be extended. For subcutaneous mastectomies, the nipple/areola is preserved by first bluntly dissecting the subareolar plane with scissors. The ducts are then divided close to the nipple base. With the nipple inverted any remaining ducts can be trimmed from the nipple 'core'.

### Practical considerations

#### Lighting

A headlight is valuable and should be part of the equipment available for most breast operations. Lighted retractors are also valuable when using IMF incisions.

#### Retraction

Care should be taken with the edges of the mastectomy flaps. Sharp hooks or tissue forceps applied to dermis cause less trauma to mastectomy flaps than blunt retractors.

#### Identifying the 'plane'

The plane is identified as a white line of superficial fascia after performing a skin incision before the flaps are lifted and retracted. With opposing retraction on skin and breast and light initial dissection, tissues are seen to separate at the level of the plane. Dissection then chases this white line with continued opposing retraction (with skin hook retraction on the upper flap, skin kept as straight as possible), cutting on its superficial surface. This produces a flap of uniform thickness that will be thicker in fatter women and thinner in others. In addition, the flap will be thinner near the nipple and thicker out to near the periphery and this gradation in flap thickness will be more pronounced in some women than others.

#### Surgical tools

My preference is to use a hand-held diathermy on a fulgurate setting throughout, or hydrodissection with scissors depending on access. Different surgeons have different preferences. Bipolar diathermy should be used for haemostasis. Blood loss for mastectomy should usually be less than 100 mL. Tranexamic acid can be given to reduce ongoing loss in patients who lose more than 250 mL.

### Preserving the intercostal perforators

The largest of the intercostal perforators tend to originate at the second or third intercostal space. These are usually encountered along their course early in the dissection just superior to the areola and can be seen (especially in thin women) and preserved during dissection upwards and medially.

### Issues regarding posterior margin

Strong opinions are often expressed regarding whether to excise the pectoral fascia and when to excise some muscle. The posterior plane or breast plate is very well defined, certainly in the middle and upper part of the breast. In these areas, there is no need or clinical evidence to support removal of the pectoral fascia. For mastectomy, preservation of the fascia is only an issue if the cancer lies posterior in the breast. If this is the case and there is concern of adherence to muscle, then a portion of pectoral muscle can also be taken. In such situations, a wide margin of muscle excision avoids the situation where a margin is reported as histologically involved or close (often due to its contraction following fixation), at no additional cost in terms of morbidity.

### Inframammary fold

With a simple mastectomy, this is normally excised, avoiding a ridge and producing a flat surface. With a mastectomy and immediate reconstruction, it is advantageous to preserve it and there is no oncological reason to ablate it.

### The anterior fat over the shoulder

This is often prominent and not part of the breast. If not contoured during simple mastectomy, it can produce a bulge in the upper outer aspect of the mastectomy site. Undermining the upper flap towards the shoulder often releases this fat pad so that it is more evenly distributed.

### A flat surface for simple mastectomy

After simple mastectomy, before closure, the chest wall should be palpated with the flat of the hand to make sure there are no ridges or prominent irregularities. If so, these can be contoured prior to closure. There is some evidence that securing the mastectomy flaps to the chest wall, so-called 'quilting', reduces seroma formation. Barbed sutures allow quilting with a single suture without the need for knots.

### Wound closure

The use of deep dermal interrupted sutures allows gathering of any discrepancy between flaps before subcuticular closure to maximise wound quality. Wound edges should be 'freshened', if traumatised by retraction during operation. Often wounds can be double-breasted, with a small reinforcing de-epithelialised segment.

### Glue

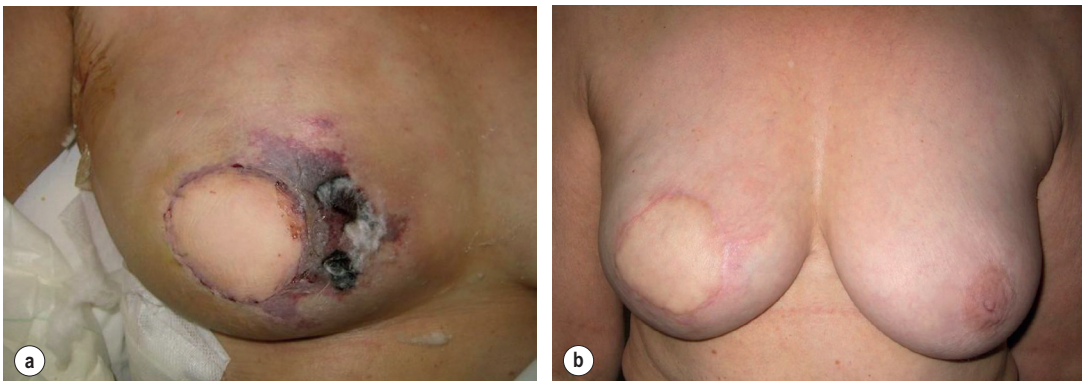
This produces a waterproof dressing that does not need re-dressing and allows showering.

### Over-dressing

If a support over-dressing (e.g. gauze and adhesive plaster) is used this should be lightly applied so as not to compromise mastectomy flap blood flow. Wound closure strips, if used, should be wide (0.5- or 1-inch) and placed parallel to the wound, *not* at 90° to the skin incision, as they can cause blistering.

### Flap necrosis

Using the principles and techniques described, flap necrosis should be a rarity (1% or 2% of cases). The main causes are smoking, poor technique selection, poor execution of dissection, failure to preserve the intercostal perforators and too much tension of the wound edges. In the circumstances where flap necrosis is encountered, early surgical debridement may allow direct re-closure and usually results in a satisfactory outcome (Fig. 9.13).




**Figure 9.13** • (a) Skin necrosis after circumareolar mastectomy and LD flap in a heavy smoker. (b) Appearance a few weeks after early (next day) debridement and primary re-closure.



## Key points

- For simple mastectomy a flat, even chest wall should be achievable in all patients.
- So-called 'dog ears' are avoidable by careful planning.
- The technique should be sympathetic to a delayed reconstruction if planned.
- For mastectomy with reconstruction many techniques are available, but a small number are preferred.
- The technique should be appropriate to breast size and the method of reconstruction.
- The technique should not compromise on access or cancer excision.
- Mastectomy techniques that produce a better cosmetic appearance do not compromise cancer outcomes or leave more tissue behind.

 Full references available at <http://expertconsult.inkling.com>

## Key references

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[Randomised trial of effects of stopping smoking for 6–8 weeks prior to knee and hip replacement surgery showing substantial reduction in risks of wound and cardiovascular complications and of secondary surgery.](#)
13. Woerdeman LAE, Hage JJ, Hofland MMI, et al. A prospective assessment of surgical risk factors in 400 cases of skin-sparing mastectomy and immediate breast reconstruction with implants to establish selection criteria. *Plast Reconstr Surg* 2007;119:455–63. PMID: 17230076.  
[Study of 400 cases of skin-sparing mastectomy and implant reconstruction demonstrating increased risks with smoking, obesity and larger breasts.](#)