



## Controversy

Breast reconstruction: *à la carte* not *table d'hôte*

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## ARTICLE INFO

## Article history:

Received 19 July 2011

Received in revised form 26 October 2011

Accepted 31 October 2011

## Keywords:

Mastectomy

Breast reconstruction

Becker implant

Latissimus dorsi flap

DIEP flap

Free flap

S-GAP

TMG flap

## ABSTRACT

NICE guidelines emphasise the need for breast cancer patients undergoing mastectomy to be offered all appropriate options for immediate reconstruction. In the majority of hospitals this is not happening. Patients are being offered the reconstruction technique for which their surgeon has been trained and many never meet an oncoplastic surgeon to discuss the wide range of options that are available. This means that many have sub-optimal reconstructions often using implants that may need to be subsequently replaced and are incompatible with post-operative radiotherapy. Patients will be better served by a few high throughput, high quality centres specialising in tailoring the right reconstruction for the woman who needs a mastectomy rather than the present system of having reconstruction of variable quality available ubiquitously.

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It is a truth, universally acknowledged that a woman in possession of a breast cancer and in need of a mastectomy can be safely treated by an immediate reconstruction. For a variety of reasons this belief is not backed up by evidence from appropriately powered randomised trials comparing immediate with delayed reconstruction in terms of relapse free survival, quality of life or cosmetic outcome.

D'Souza et al. recently conducted a Cochrane analysis of the effects of immediate versus delayed breast reconstruction.<sup>1</sup> They found only one randomised controlled trial, published in 1983, that comprised 64 women randomly treated by immediate or delayed reconstruction 12 months after mastectomy.<sup>2</sup> Psychosocial morbidity was measured 3 months after surgery and deemed to be reduced in those who had immediate reconstruction. Both sexual and social morbidity were unaffected by timing of reconstruction. D'Souza et al. concluded that this trial had methodological flaws, high risk of bias and was underpowered for meaningful statistical analysis. Furthermore they opined that study designs other than RCTs would be needed to investigate the respective effects of immediate and delayed reconstruction.

In a retrospective matched cohort study 125 women who underwent delayed large flap breast reconstruction were matched individually with 182 women with breast cancer who had a

mastectomy but did not undergo breast reconstruction.<sup>3</sup> Matching criteria were year of diagnosis, age at diagnosis and treating hospital. Medical records were evaluated until October 2007. Median follow-up for the entire cohort was 146 months and the reconstruction group had a 2.08 (95% CI 1.07–4.06) times higher risk of recurrent disease than the mastectomy only group.

In an Italian multicentre study, Becker implants were used in 248 breast reconstructions of which 70% were immediate and 30% delayed.<sup>4</sup> Complications occurred in a similar proportion of the immediate (40%) and delayed (46%) cases. Greco et al. reported on outcome after reconstruction in a series of 196 cases treated in one centre with 134 (68%) having a delayed and 62 (32%) an immediate procedure.<sup>5</sup> Timing had no impact on cosmetic outcome: the only significant risk factor was obesity.

Nevertheless, this credo of immediate reconstruction has become enshrined in the NICE guidelines *Early and locally advanced breast cancer: diagnosis and treatment* February 2009.

## The recommendation states

“Discuss immediate breast reconstruction with all patients who are being advised to have a mastectomy and offer it except where significant comorbidity or (the need for) adjuvant therapy may preclude this option. All appropriate breast reconstruction options should be offered and discussed with patients, irrespective of whether they are all available locally.”

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So what are the appropriate breast reconstruction options? These range from relatively simple implants to complex free flaps involving microvascular anastomoses. Furthermore the European Parliament resolution on breast cancer in the European Union (2002/2279(INI)) states: “wherever possible, breast reconstruction operations are performed using the patient’s own tissue and within the shortest possible time”.

The majority of breast surgeons have had some training in reconstructive surgery but for almost all this is limited to pedicled flaps and implants. For some patients these are very reasonable options but if carried out in unsuitable cases will give rise to a poor cosmetic result and potentially great distress for both patient and surgeon. In a recent medico-legal case, after being reassured by a breast surgeon that her reconstructed breasts would be better than the real ones a patient underwent bilateral skin sparing mastectomies, latissimus dorsi flaps and immediate nipple reconstruction. Both nipples became necrotic and the patient ended up with a very poor cosmetic outcome. Her first contact with a plastic surgeon was after the complications had occurred.

In a recent analysis of Hospital Episodes Statistics data by the Clinical Effectiveness Unit at the Royal College of Surgeons of England some startling figures emerged.<sup>6</sup> Of 44,837 patients undergoing mastectomy between April 2006 and February 2009, only 7373 (16.5%) underwent immediate reconstruction. Among those aged <50 years, 33% had an immediate reconstruction. Although there was a lower rate of reconstruction among those with co-morbidity, after adjustment for patient characteristics there was still a rate varying between 8% and 29% for the 30 Cancer Networks. It is evident that NICE guidelines are being ignored.

The National Mastectomy and Breast Reconstruction Audit 2009 reported that of 17,059 women undergoing mastectomy only 3216 (18%) had immediate reconstruction and a mere 9% (1580) went on to have a delayed reconstruction.<sup>7</sup> Patients having immediate reconstruction were younger (mean age 51 versus 64 years), less likely to be obese (17% versus 29%) or be diabetic (8% versus 2%).

The options for breast reconstruction are summarised in Table 1 which gives major advantages and disadvantages of each approach. Becker implants which can be simple and speedily inserted have the major disadvantage of capsule formation. Risk of fibrosis will be increased if post-operative radiotherapy is given and the requirement for this may not be apparent pre-operatively. Indications for reconstruction irradiation include: large tumours (>5 cm), extensive axillary nodal involvement (>3 nodes positive) and extensive lymphovascular invasion (LVI). The extent of the tumour may not be known until after the pathologist has examined the mastectomy specimen in detail.

Latissimus dorsi (LD) flaps may give reasonable cosmetic results and can be irradiated but the need to replace the implants renders this less suitable for younger women having bilateral prophylactic mastectomies because they are *BRCA1/2* carriers. Such individuals might need three changes of implant during their lifetime. The transverse rectus abdominis myocutaneous (TRAM) flap provides autologous tissue to reconstruct a breast mound which is soft and ptotic and can withstand radiotherapy without undue fibrosis. Because of the double blood supply of the rectus abdominis muscle the flap can be pedicled, based on the superior epigastric vessels, or free using the inferior epigastric supply. Complications include flap necrosis and herniation, despite mesh repair of the anterior abdominal wall.

To eradicate donor site morbidity the Deep Inferior Epigastric Perforator (DIEP) flap is based on perforating vessels which are identified by approaching them laterally with no resection of fascia. In experienced hands the procedure carries low morbidity despite the mean operating time being over 6 h. The ability to perform a DIEP flap is predicated on the presence of sufficient abdominal fat – not a problem in most older women but often a contraindication for the procedure in younger women. This is a difficulty that arises in up to 20% of cases needing reconstruction.<sup>8</sup>

Part of the morbidity of lower abdominal flaps is the likelihood of hernia formation which is directly related to the extent of damage/removal of the rectus abdominis muscle and sheath. There is a range of risks: the greatest chance of herniation being in those having a pedicled TRAM, then free Tram, DIEP and least likely in those having a superficial inferior epigastric artery flap. Because of the increased vascular morbidity following SIEA flaps they are not in general use.

Another method of overcoming the problem of breast reconstruction in the thin patient is the free superior gluteal artery perforator (S-GAP), originally described as a method of treatment of sacral bed sores. The most difficult part of the procedure is the venous dissection but despite this venous thrombosis occurs rarely, as does flap loss.

With the transverse myocutaneous gracilis (TMG) flap, taken from the inner thigh region, an average volume of 350 cc can be obtained. In comparison to the S-GAP the TMG is an easier flap to harvest, but its application is limited to immediate reconstruction. Its usage has become more common, especially in bilateral reconstruction, where no turning of the patient is necessary and adequate volumes can be harvested in thin patients. The choice of flaps in thin patients is made as a combination of the shape and size of the breast to be reconstructed and the availability of tissue from buttocks and thigh.

**Table 1**  
Techniques for breast reconstruction after mastectomy.

Procedure	Advantages	Disadvantages	Comments
Becker implant <sup>17</sup>	Quick, simple	Difficulty achieving symmetry	Capsule formation likely after radiotherapy
Latissimus dorsi (LD) flap <sup>18</sup>	Robust	Needs an implant, shoulder dysfunction	Unsuitable young women because on need to replace implant
Extended LD flap <sup>19</sup>	Avoids implant	Shoulder dysfunction	Significant scar
Expander with acellular dermis matrix	Quick, simple	2 stage procedure	Symmetrisation of other breast always needed
Transverse rectus abdominis myocutaneous (TRAM) flap <sup>20</sup>	No need for an implant. Can be irradiated	Risk of abdominal herniation and flap loss	Unsuitable for thin patients
Deep Inferior Epigastric Perforator (DIEP) flap <sup>21</sup>	Good tissue match. Low hernia risk	Flap necrosis with increased risk in smokers, obese and diabetics	Unsuitable for thin Mean operating time 6 h
Superior gluteal artery perforator (S-GAP) flap <sup>22</sup>	Useful in thin young women	Distortion at donor site	Complex procedure
Transverse myocutaneous gracilis (TMG) flap <sup>23</sup>	Useful in thin young women. Easier flap to harvest	Only in immediate reconstruction	Average harvest 350 ml

**Table 2**  
Comparison of procedures performed in National Audit 2009 and at GSTT 2008–2009.

Type of surgery	National audit N (%)	GSTT N (%)
Implant/expander only	1190 (37%)	49 (28%)
Pedicle flap + implant/expander	683 (21%)	40 (22%)
Pedicle flap (autologous)	892 (28%)	3 (2%)
Free flap	451 (14%)	85 (48%)
Total	3216	177

Probably one of the most difficult aspects of reconstruction is re-creation of the nipple areolar complex. The range of techniques available: C-V flap,<sup>9</sup> dome flap,<sup>10</sup> arrow flap, quadrapod flap,<sup>11</sup> double opposing tab flap,<sup>12</sup> nipple-sharing<sup>13</sup> illustrate the difficulty of achieving durable areolar and nipple projection.<sup>14</sup> Non-surgical interventions including tattooing<sup>15</sup> and adherent nipple prostheses. Although moulded prostheses based on the surviving nipple areola can achieve excellent symmetry this may not be acceptable to many patients.

The reconstructions reported to the National Mastectomy and Reconstruction Audit 2009 are given in Table 2. These are compared with the procedures performed at Guy's & St. Thomas' during the similar time and indicate a significant difference in pattern of reconstructions (Pearson  $\chi^2 = 148.44$ ,  $p < 0.000$ ). One reason for this is the increased use of autologous free flaps where there is an availability of fully trained oncoplastic surgeons with microvascular expertise. The advantage to the patient from an autologous flap is that it is not going to alter in a major way if irradiated. The need for chest wall irradiation cannot always be determined pre-operatively since extensive vascular invasion or nodal involvement may not be apparent on pre-operative imaging. Additionally even after breast MRI in cases with invasive lobular cancer the full extent of the single file pattern of infiltration may be beyond the resolution of this imaging modality.

Because autologous flaps do not require a silicone prosthesis this means that the need for subsequent surgery to replace a senescent device is unnecessary. This also increases the acceptability of an immediate procedure for those women who do not wish to have a foreign body implanted as part of their reconstruction.

The major point is that breast reconstruction has to be tailored to the needs and body habitus of the patient. Whenever possible the procedure should be performed at the same time as mastectomy in order to minimise the alteration in body image that will ensue. Repeated procedures because of sub-optimal cosmetic outcome are time-consuming, distressing for the patient and also costly in terms of Health Service resources. Apart from attention to detail in the reconstruction an important aspect of achieving an acceptable outcome is the counselling that the patient has received from breast surgeon, breast care nurse and, when appropriate, the oncoplastic surgeon. Untrammelled expectations are likely to lead to dissatisfaction on the part of the patient.<sup>16</sup>

The panoply of oncoplastic procedures cannot be available on-site at all hospitals because there would be insufficient workload to allow expertise to be built up. As a result, there is a mismatch between what is recommended in NICE guidelines and the reality of choice, or lack of it, offered to the patient at a very vulnerable time of her life. More patients should be given the opportunity to discuss options with a Plastic surgeon. Too many patients are having the reconstruction that their breast surgeon has been trained to

do rather than the procedure which is best for them. Sub-optimally selected and performed surgery will result in more complications which will usually require more surgery and consume more resources at a time when there will be increased budgetary constraints on Trusts. Health Services will be better served by a few high throughput, high quality centres specialising in tailoring the right reconstruction for the woman who needs a mastectomy rather than the present system of having reconstruction of variable quality available ubiquitously.

## Competing interests

ISF and JF have no commercial support and no non-financial interests that may be relevant to the submitted work.

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